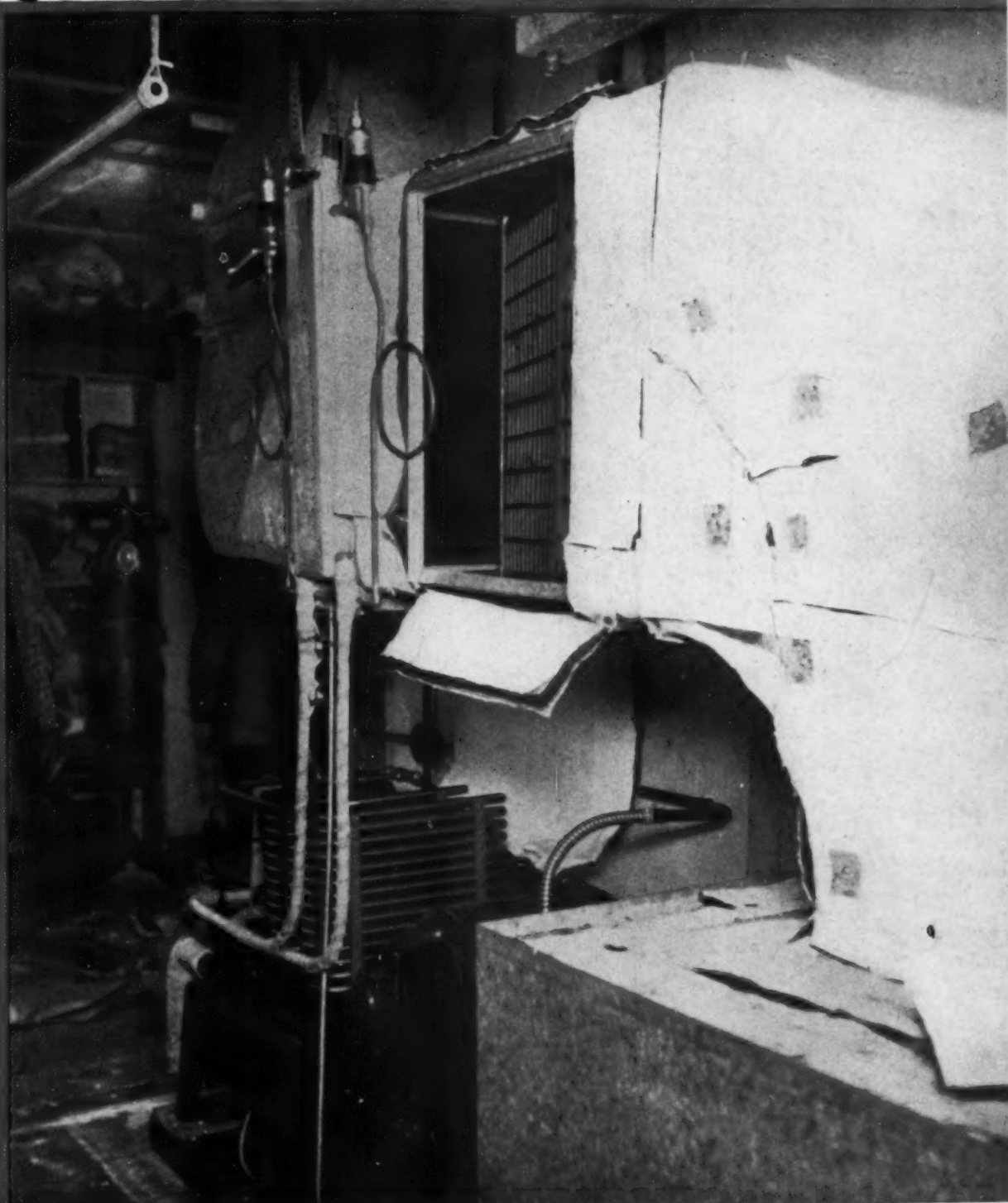


AMERICAN ARTISAN

WARM AIR HEATING • SHEET METAL
CONTRACTING • AIR CONDITIONING



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JULY
1935

THE AIR CONDITIONING SECTION

Page 27

AMERICAN ARTISAN

Insure permanency in exposed sheet metal with



When this elevated line recently re-roofed its stair canopy, the familiar trade mark of Toncan Iron told the thousands of passers-by that this roof was installed for permanency.

Toncan Iron has been used during the last twenty-seven years for every conceivable use to which sheet metal can be put. It has given an excellent account of itself in all industrial, marine and rural exposed work—in flashing, gutters and downspouts—in a host of other vital applications where a better metal is worth a little additional cost.

Toncan Iron lasts longer, because it is a carefully-made alloy of refined open hearth iron, copper and molybdenum—more resistant to rust than ordinary steel and equally resistant throughout its entire thickness. In addition, it is extremely ductile and therefore easy to fabricate.

The story of this modern metal is told in "The Path to Permanence," which also contains hundreds of suggestions where it can be used to advantage and to your profit. A copy of this interesting book will be sent upon request.



Republic Steel

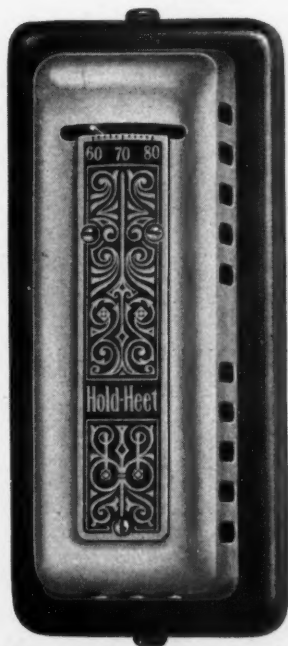
C O R P O R A T I O N

GENERAL OFFICES . . . YOUNGSTOWN, OHIO

\$13 Unlucky for Competition

Hold-Heet (3 piece) Regulator Set

Dealer Price with New "Quick" Thermostat

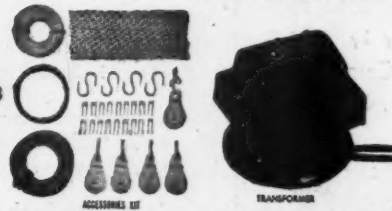


This new "Quick" Thermostat has a $\frac{1}{2}^{\circ}$ differential which is adjustable. There is no substitute for an accurate Thermostat with a small differential. It responds only to an ACTUAL change in room temperature so that it is far superior to the flasher or heating coil type of Thermostat. The quick response holds room temperature to the minimum that is possible with a three-unit installation. The adjustable lever is at the top so that low mounting is practical if desired. The new Thermostat looks small because of the two-tone oxidized silver finish on the cover. It is of sufficient size, however, to allow for the use of an ample size bimetal coil that will insure accuracy and close regulation. With slow burning fuels like anthracite, many Regulator Sets are installed without a Limit Control. There are also many Regulator installations which the home owner wishes to make at minimum expense so as to obtain some of the advantages of automatic heat with a view to adding a suitable Limit Control at a later date. This new Hold-Heet equipment is ideal for such use. It employs the same No. U15 Hold-Heet Damper Motor that is famous throughout the industry for dependability and ample power. Here is a sales leader that will open new prospects for Air Conditioning Equipment and pay handsome dividends at the same time.



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with Accessories and "Quick" Thermostat



as illustrated
\$13

Dealer Cost—
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No. 3A Warm Air Limit Control.....	\$4.00
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No. 3W Hot Water Limit Control.....	4.00
No. 3P Combustion Control.....	4.65
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\$17³⁵ Hold-Heet (4 Piece) Regulator Set

with Combustion Control

New
Dealer
Price

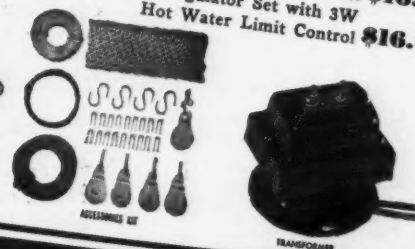


This is the famous Hold-Heet No. 1 Unit with Combustion Control that was adopted by 59 of the 76 furnace manufacturers the first year that it was offered on the market.

- COMBUSTION CONTROL** (Stack Limit Switch) performs three vital and necessary functions that can not be obtained with competing equipment:
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AMERICAN ARTISAN

With which is merged

**FURNACES
AND
SHEET METALS**

AND

**Warm-Air
Heating**

Vol. 104, No. 7

July, 1935

Founded 1880

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More than 7,000 copies of this issue are being distributed.



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WAS LATER FORMED BY
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You Might Expect!

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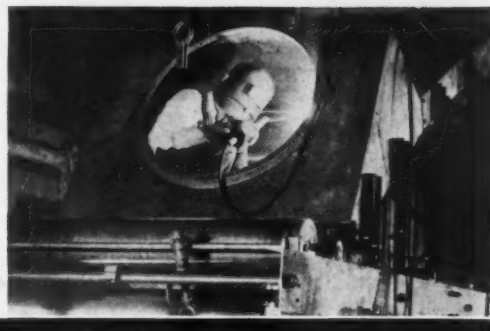
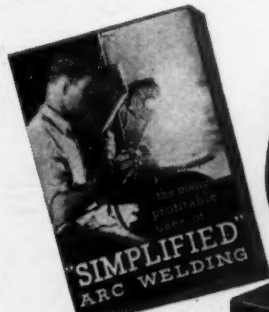
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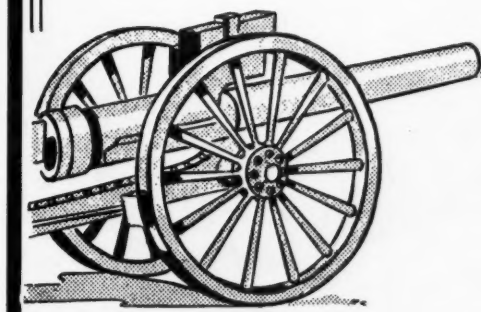
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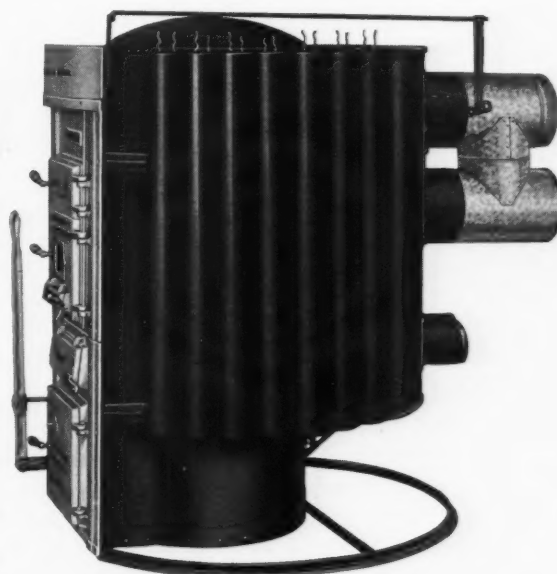


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FROM GUNS

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HEATING	11%
PAINTING OUTSIDE	10%
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PLUMBING	9%
EXTERIOR REPAIRS	9%

SUNBEAM

Will Help You Obtain Your Share!

No doubt, many heating contractors who read this message will be surprised to know that under the modernizing provisions of the National Housing Act new heating equipment is second in the classifications of materials financed. And, no doubt, many of these heating contractors have been wishing for a sales-producing financing plan, because it will enable them to close numerous good prospects who cannot pay cash.

The Sunbeam Finance Plan in connection with Federal Housing Administration is exactly the kind of financing service which you have been seeking. It enabled one Sunbeam dealer to sell 45 furnaces and air conditioning units within a period of 90 days!

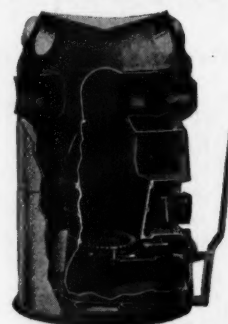
The home owner makes no down payment—makes monthly payments as low as \$10, for a period of one to three years, at the lowest financing rates in history! There is no mortgage, no red tape, no endorsers. A simple statement is filled out right in the privacy of the home.

Dealers file no financial statements—accept no financial responsibility—receive all their money immediately; there is no hold-back.

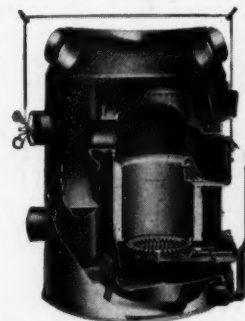
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With the Summer Finance Plan, you can sell Sunbeam Furnaces and Air Conditioning Units NOW, but the first payment is not due until September 30! No increase in F.H.A. financing rates for deferring payments until Fall.

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Furnace*



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Name

Address

City and State

A-7

SUNBEAM
WARM AIR FURNACES AND
AIR CONDITIONING UNITS



AMERICAN ARTISAN

Prospects No End

A few days ago we called on a man whose job it is to sell cooling to commercial prospects. This chap doesn't operate in a metropolitan city. In fact, his field of operations is a town of less than 60,000 persons with possibly 1,000 retail establishments of all kinds and certainly not more than 50 good prospects for summer cooling, (by our reckoning).

To make the proposition more interesting the city lies somewhat north of the generally accepted line marking the "good" cooling zone from the "not-so-good" area and is in a part of the country where a few minutes' drive reaches lakes, rivers and a resort district.

Was this man pessimistic? Not in the least. We found him down in a basement superintending the installation of a five-ton cooling system in a combination tavern, soda fountain, restaurant. He had just completed the installation of a 15-ton job a short time before.

"What type of establishment," we inquired, "do you find offers the least resistance to cooling sales?" His reply ran about like this: "My best field so far has been restaurants, taverns, eating places. Once I get a cooling job in a neighborhood, or in a block, or in a town, I know I'm going to get several others. People flock to the cooled establishment. That drives other proprietors into line. The second best is that group of businesses where numbers of persons gather in hot weather. Mortuaries, dance halls, small theaters. The third is the specialty retail establishment where the volume of a sale—if not the sale itself—depends on having a comfortable customer on whom to work. Dress shops, beauty parlors, specialty shops of all kinds make up this field. Beyond that I haven't gone because I see enough work in these three fields to keep me busy for several years."

"And what argument swings them into line?" was our next question.

"The competitor has a cooling system," was his reply. "Of course, it's real work getting the first job lined up. But just as soon as one well-known business has cooling all the competitors want cooling and will listen to my story."

"One thing I've discovered. The fields to tackle are

those where competition is keen. Give me a field where several first class and several second class concerns are fighting for business and I'll show you a field which will produce cooling sales."

"Yes, but cooling is a short period proposition here," we said, "what do you do all winter?" His reply was—"That's when I get in my ground work. Take for instance this restaurant job. I really sold this job last winter by telling the owner that if he didn't install cooling his sales this summer would surely go to the chap in the next block. I gave him all winter to figure out ways and means of paying for the job. The result—I am now putting the job in. Winter is highly important. That's the time to get your prospects uncovered and analyzed. It's the time to explain your whole story. In the summer you're so busy drawing plans, closing sales, superintending installations, you haven't a moment to waste in long winded explanation."

Four years is the time this man has given himself to get his town well worked over. And he appreciates that during that time other agencies will be out after cooling work. Not a bad prospect for a hustler, say we.

Facts Vs. Fiction

The purpose of a business paper is not political. What party is "in" or "out" ought not influence a business paper's general policy. But those situations for which a political party are rightly responsible and which, in turn, influence the industry served by any paper are matters of vital concern to any paper and its readers.

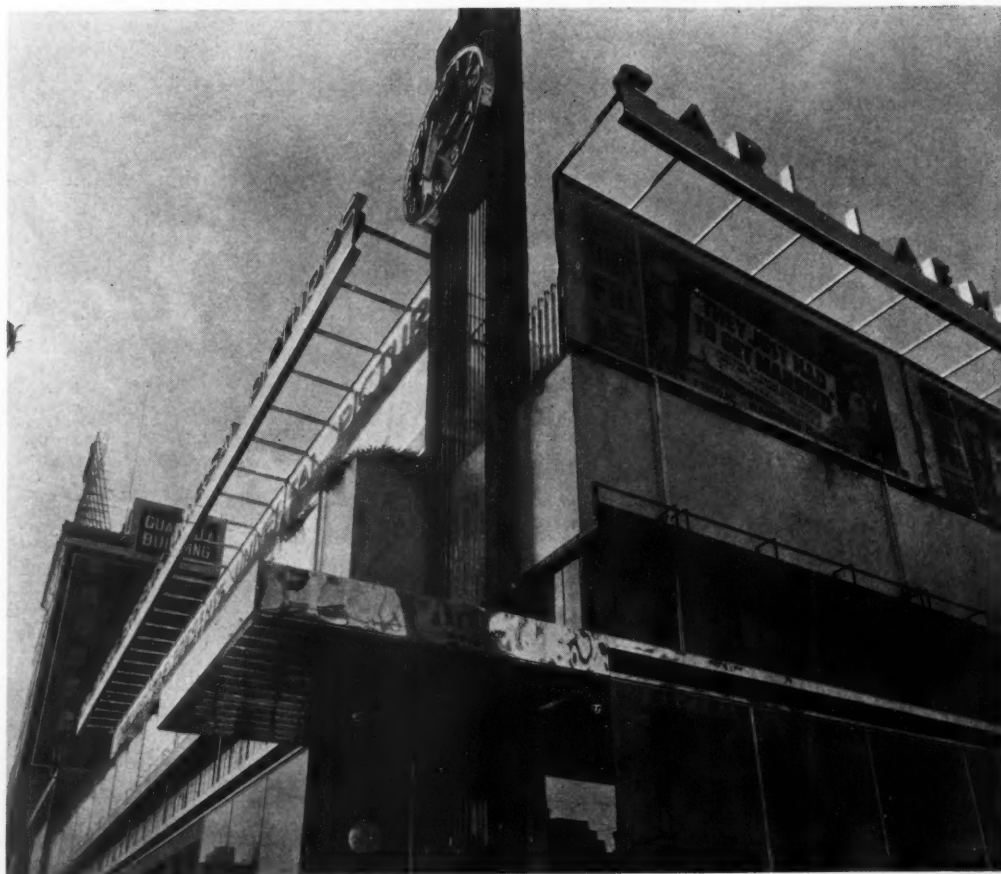
It is logical, therefore, to present a fact which has not received the recognition it deserves. That fact deals with a comparison of FHA and NRA.

NRA was touted by its sponsors as the cure-all for every industrial evil particular to our industry and all other industries. In our case NRA did not deliver its claimed advantages because the act was drawn with little recognition for the basic problems of the construction industry. Even though NRA had survived the searching analysis of the United States Supreme Court, it is questionable whether NRA would have brought recovery or have progressed because of recovery.

On the other hand FHA has received little of the ballyhoo of NRA, but because the act, its aims and its methods of operation are basically sound it has placed within one year almost one-half billion dollars of actual construction work under contract.

Our industry as shown by reports from all branches and all parts of the country has received somewhat more than its proportionate share of this construction dollar. This indicates that heating systems and residential repairs, as well as modernization for such things as air conditioning are needed and wanted and will be bought as quickly as financing means are placed at the disposal of owners.

It may be wise for the construction industry to place behind FHA some of the energetic effort we did and would have given NRA.



Corner view of the Laemmle building showing arrangement of horizontal and vertical lines, projections and metal application.

What Is This Modern Metal Architecture?

By A. B. Laing

DURING the last five years there has been built in most cities of the country one or more of the modernistic buildings where bright metal is used for eye appeal and unbroken lines, projections and shadows accentuate the plain design of the modern school of architecture.

Not one man, but many, have had a hand in the development of this new style. This school of architecture is to date the ultimate development of modern design which abolished the ornate cornice and embellishments of which the old time sheet metal contractor was so fond. The general trend to plain surfaces and unbroken lines has been even more pronounced than the actual construction of truly modern structures. These truly modern buildings have many points of

merit and contain much promise for the sheet metal craft.

This article discusses points of design and interest of a building not new, but designed by one of the pioneers of the modern school. As a typical example of modern design the features of construction wherein sheet metal is used are of interest.

The structure is the Carl Laemmle building in Hollywood. The architect R. J. Neutra, Los Angeles, is one of the pioneers of the modern school. Architectural reviews of his work have appeared in almost every language. "Die Augilde" of Berlin acclaims him as "among the most important architects of our time." Similar tributes have appeared in Czech, Finnish, Russian, American, English, French and Japanese architectural circles and mag-

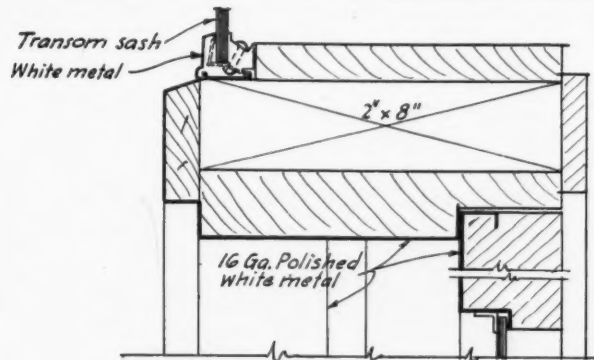
azines. "No more gingerbread," "His buildings suggest a veil of glass and steel," "His designs offer a light, aerated, livable aspect due to the horizontal lines, use of glass and metal," are a few quotations.

The ambition of this school of architecture is, first—to avoid all building materials which are affected by the weather. Second—to make all buildings adaptable to factory production and fabrication in order to save time, labor and materials. Third—to make small commercial building fabrication comparable to automobile, pre-fabricated house and other forms of factory mass production.

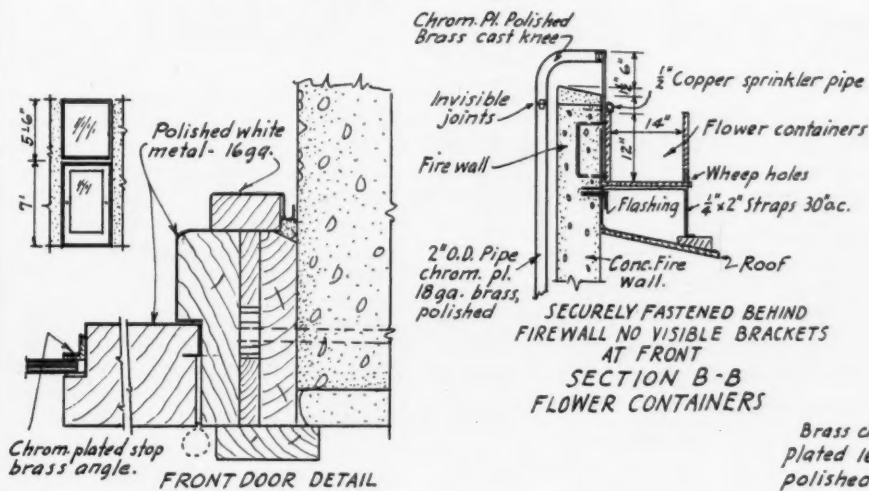
That this plan is hardly applicable to multi-story office buildings goes without saying, but that the plan has merit for

(Continued on page 17)

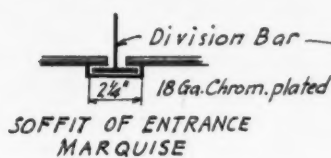
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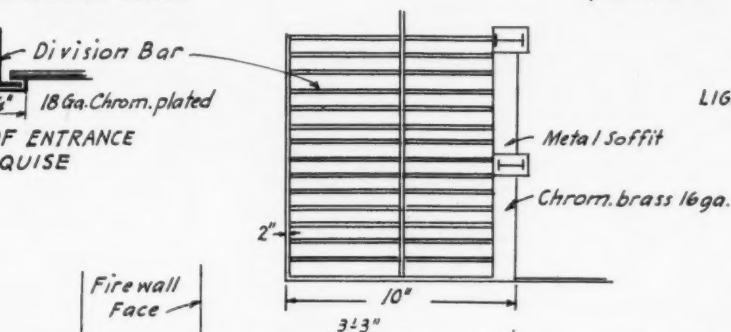
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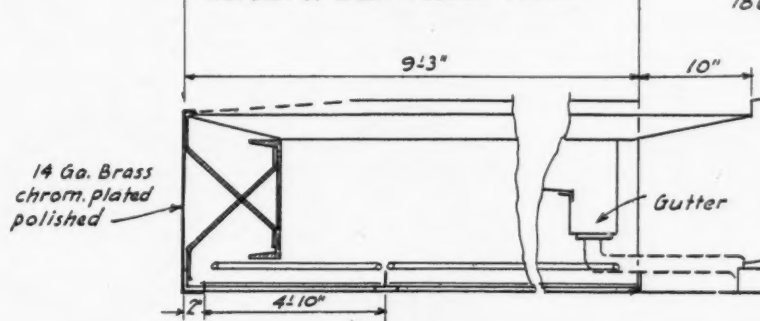
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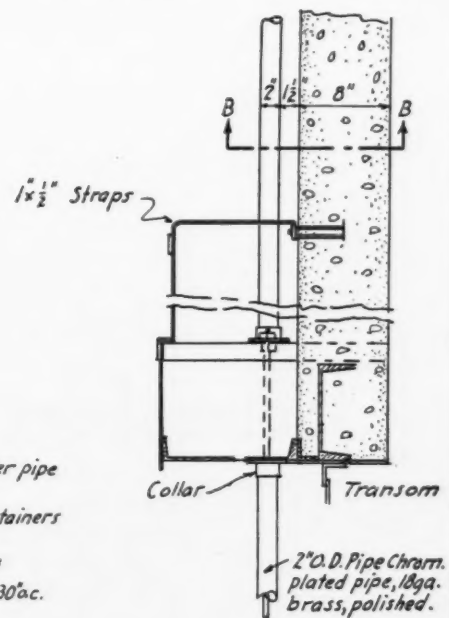
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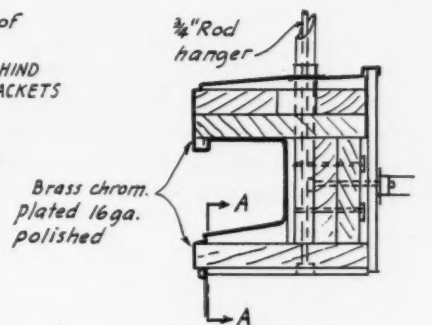
RETURN OF LIGHT TROUGH FACIA.



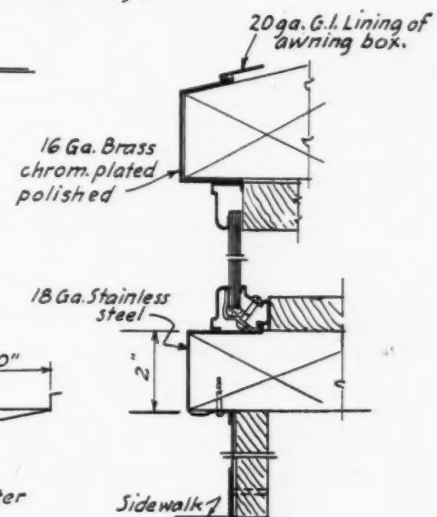
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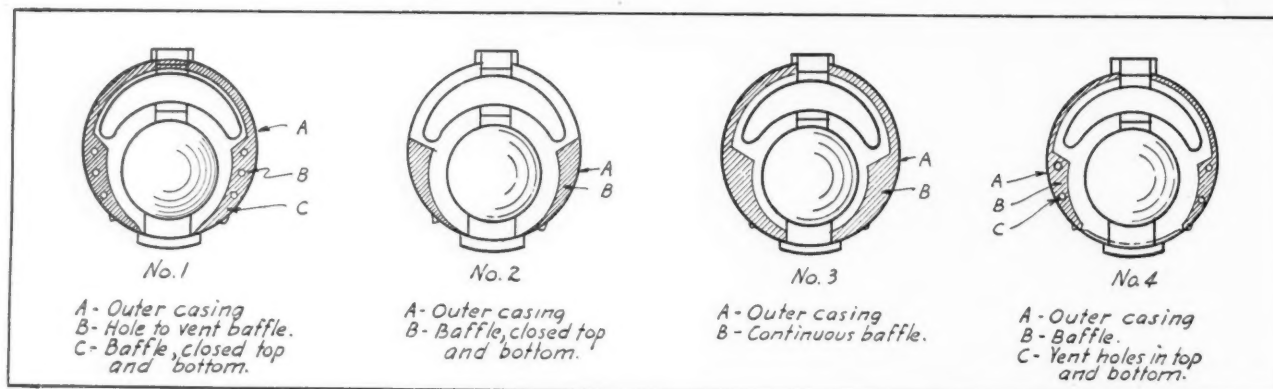


LIGHT TROUGH & AWNING BOX.



STORE FRONT DETAILS SECTION A-A





Some Suggested Baffling Practices

Whenever a gravity furnace is converted to forced air, we should baffle the casing to insure that the faster moving air will impinge on the hot surfaces. If some air goes by without picking up heat, we have trouble. Here are several baffles for crescent-shaped radiator, steel furnace casings.

CONTRACTORS converting existing gravity furnaces to forced air by the application of a blower located on the floor, long ago discovered that the gravity casing is much too large, a condition which permits some of the air to flow through the casing without picking up any heat. This effects a general lowering of all air temperatures in the bonnet or, worse, brings about differences in bonnet air temperatures from leader to leader.

This need for restricting the area within the casing has been investigated at the Research Residence at Urbana and was briefly referred to by Mr. Konzo in his article published in the February, 1935 issue of American Artisan.

The customary practices of contractors and engineers is by no means uniform. One contractor may use one scheme, another contractor a totally different application. The purpose of this article is to give some current plans as used

by contractors and engineers located in the principal warm air heating zone. The sketches show the various plans; the text gives reasons why certain arrangements are used.

NUMBER 1

A. H. Kundee, Engineer, Premier Warm Air Heater Co., Dowagiac, Mich.

"There are a thousand ways to baffle a furnace when applying a blower, but in my estimation the important thing to keep in mind is that any gravity casing should be baffled in some way to get more efficient results. We recommend box baffles as shown in sketch Number 1 with vent holes to permit a small flow of air through the baffle to keep the baffle and casing cool. The lower edge of the baffle should be at or just above the grate line. The upper end of the baffle should be level with the top of the radiator. If radiation shields are used, make the shield the inner surface of the baffle. If no shield is provided, we recommend hanging one just inside the inner surface of the baffle box."

NUMBER 2

A. W. Hunt, Contractor, Kansas City, Mo.

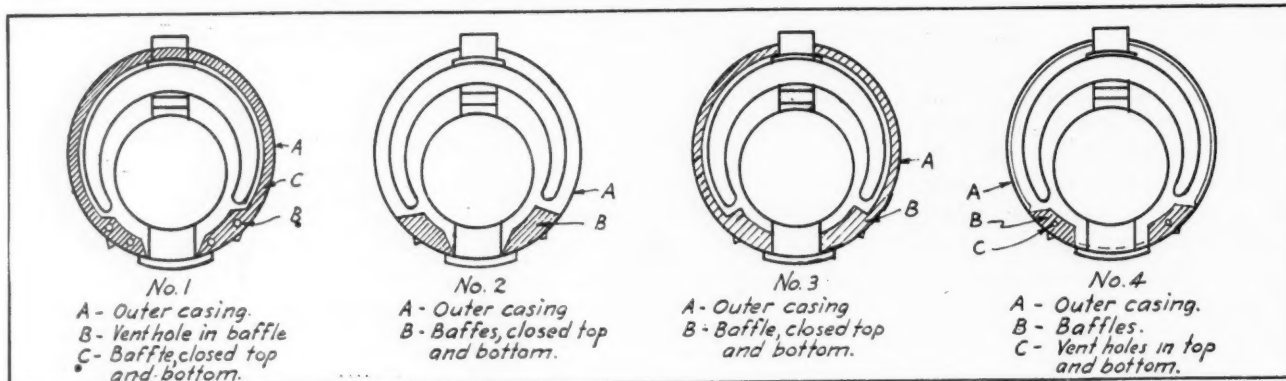
"Gravity furnaces frequently have as

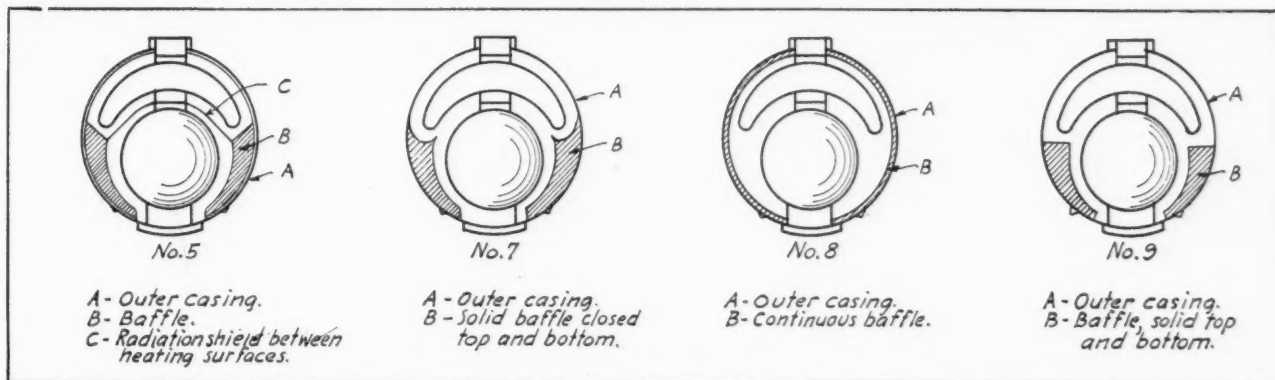
much as 12 inches of space between the outer edge of the fire bowl and the casing or liner. This is far too much space. Ordinarily we cut this in two by placing a closed-in, top and bottom box baffle as shown in sketch Number 2. On high velocity blower installations we often reduce the space to 5 inches. The baffle begins at the level of the grate and extends to point level with the top of the radiator. The baffle box is metal screwed to the casing. We recently adopted another idea—punching about 15 one-half inch holes in the top and bottom of the baffle box. This lowers the air temperature inside the baffle and also the temperature of the casing."

NUMBER 3

C. J. Meyer, Contractor, Buffalo, N. Y.

"It is difficult to plan baffling unless you have had first hand information on the type and size of furnace being used; also the amount of air handled by the blower. In a steel furnace such as sketch Number 3 we have found that you must be very particular because if the air does not impinge on every part of the furnace trouble develops. We generally use the blocked top and bottom type of box as shown. Where the radiator wraps far around the furnace we continue the baffle as shown because these large radi-





AMERICAN
ARTISAN
DATA
SHEETS

ators may not be uniformly hot, or even very warm, and a thin opening eliminates any possible trouble of cold air getting by. We have found that 5-inch holes cut horizontally through the baffle box provide circulation of air inside the baffle box and make the baffle act as a sort of tempered air passage. Furthermore, these holes reduce the casing temperature. At the same time there is no lost air pressure. The top of the baffle is usually carried over the top of the furnace as shown in the elevation; the size of the opening equalling the pipe area required for the house."

NUMBER 4

A. R. Schwantes, Engineer, Waterman-Waterbury Co., Minneapolis, Minn.

"A single sheet casing liner is used with almost all warm air furnace casings. The purpose of it is to intercept and absorb radiant heat from the heated furnace surfaces, which heat is caught up by convection to the air circulating through the casing. It is therefore, common practice to allow the air to circulate both inside and outside the liner, so as to have a rubbing effect on both surfaces.

"The purpose of casing baffles is, first, to restrict the area in parts of the casing cross section so as to cause circulating air to impinge more evenly on the heated surfaces. This increases the velocity of air through the casing, produces a higher bonnet temperature and better temperature distribution over the section of the casing.

"The second use of a baffle is an incidental one; it must substitute for the casing liner.

"If baffles shown were to supplement the casing liner, they would have to be

applied to the latter, in which case circulating air would be allowed to pass between the liner and the outer casing all around. This means that portions of the air circulating through this space would be cooler than other portions, because the baffle would have the effect of a double wall liner.

"The installation should be made in each case by cutting away the liner sheet where the baffle is to be installed and then the baffle with closed top and bottom should be fastened directly to the outer casing.

"This gives same baffling effect, as far as restriction of area is concerned, but does not allow air to circulate between the baffle and the outer casing except through a few small holes in the top and bottom of each baffle used to ventilate the same. These openings still provide for circulation of air on both sides of all liner sheets, retaining the benefit of wiping effect of the air thereon but eliminating the passage of air outside of a double wall liner where the air is apt not to receive sufficient heat.

"The size of these small openings in the top and bottom of baffles must be left to the discretion and experience of the manufacturer and installer. Ordinarily a few 1" or 3/4" openings, spaced as indicated on the sketches, will suffice."

NUMBER 5

F. L. Meyer, Meyer Furnace Co., Peoria, Ill.

"Our practice in baffling gravity casings is to follow the heating surfaces of the furnace, thereby providing a space through which air may flow uniformly within certain limitations. We feel that baffles should be at greater distances from prime heating surfaces (such as the com-

bustion drum) than from secondary heating surfaces (such as the radiator).

"A sound principle, to our mind, is to place a radiation shield between two heating surfaces, such as the combustion drum and the radiator. We have shown such a shield in sketch Number 5A. The same condition exists in furnaces having long wrap radiators (sketch Number 5B) but because of the large wrap a radiation shield is hardly practicable.

"Baffles and shields should be of black iron. We recommend that the box baffles shown in sketches 5A and 5B should be closed in at the bottom to prevent any air circulating within the areas, but we leave the baffle open at the top so that heated air may escape. The lower edge should reach a point level with the lower edge of the radiator or the grate line, whichever is lower."

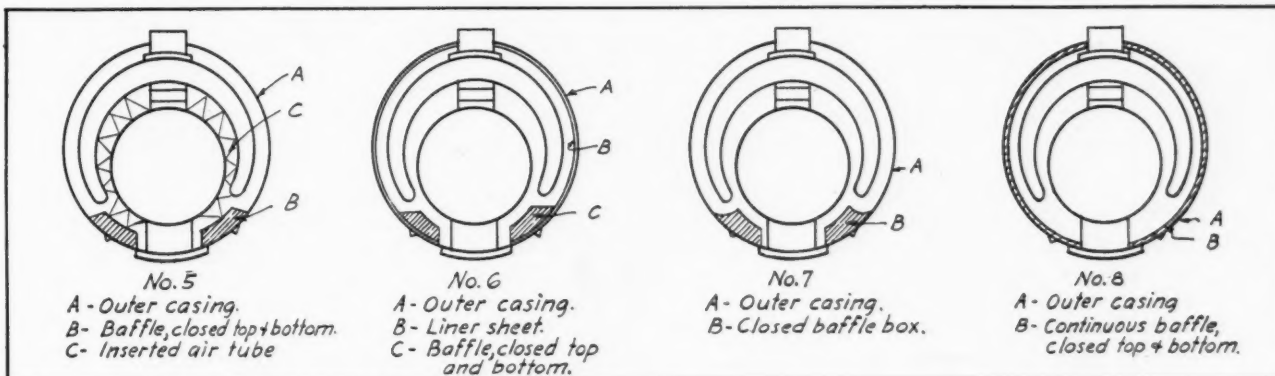
NUMBER 6

Jay Barton, Contractor, Detroit, Michigan

"The application of baffles to a gravity casing transformed into a forced air casing is not a matter for guesswork. The contractor must know exactly the operating characteristics of his furnace and blower; also the register air temperature, free area of leader pipe used, velocity of air over heating surfaces and what kind of fuel will be used.

"Our general style of baffle for steel furnaces consists of a boxed section fastened to the outer casing and closed in at the top and bottom. The box extends from the grate level to a point just below the radiator top. The idea is to compel all air passing through the casing to 'scrub' the prime and secondary heating surfaces. Since the air is going through the casing

(Continued on page 23)



Pressure Balances In Exhaust Systems

By J. W. Baybutt

Instructor, Rochester Athenaeum
and Mechanics Institute

GENERALLY the exhaust system in a hazardous dust industry is treated as an unimportant part of the equipment layout, even though most states have strict regulations governing such installations. The separator and fan are usually stuck in a far corner with little concern given to the efficiency of the system unless the metal contractor has sales ability enough to advise the best location for the fan at the probable expense of slight rearrangement to the machine layout and a little extra cost.

The accompanying sketch marked Fig. 1 shows the design for an exhaust system submitted for criticism and advice. This system is typical of many proposed and existing installations except that the separator is on the suction side of the fan. While there may be some advantages in a suction-type separator, particularly with some dusts, I would expect more operating difficulties with a suction unit than with the pressure, assuming equivalent sizes. The submitted piping dia-

gram has been analyzed and the pertinent information added to the sketch (all figures are approximate).

With regard to some of the notes it may be well to remember that certain air velocities are required to carry various dusts from the hood to the separator. In the case in question, a velocity of 4500 feet per minute (FPM) is considered satisfactory. The velocity pressure corresponding to this velocity is about 1.3 inches of water, and on this basis we would suggest a U-Gage suction at the hood of 2.6 inch water suction pressure.

A resistance to flow of air naturally exists in the piping the same as in flow of any fluid. This resistance for air is usually measured in terms of inches of water per 100 feet and the fan must be powered to accommodate these total pressure drops so that the required suction is maintained at the nozzle. Changes in velocity are noted throughout the system drawing due to the pipe sizing and if the system

works actually as per theory there will be some deposits in the ducts where the lower velocities occur. This condition will also exist when some of the outlet dampers are closed.

While damper closing may save power in the typical existing system, plugged lines are liable to result from such practice. The accepted practice of increasing the mains 20 per cent is also nice to start with, but usually results in material deposits which offset the gain.

In Fig. 1, it is interesting to note the total pressure drops existing at the 12, 14 and 20-inch fork. On the basis of the outlets as shown the total pressure drop in the 12-inch branch is about 2.95 inches as against 6.76 inches for the 14-inch branch. This means that the hoods on the 12-inch branch will be favored at the expense of the other hoods, particularly the ones at the extreme end of the 8-inch line.

While it is theoretically possible to balance a piping system so that

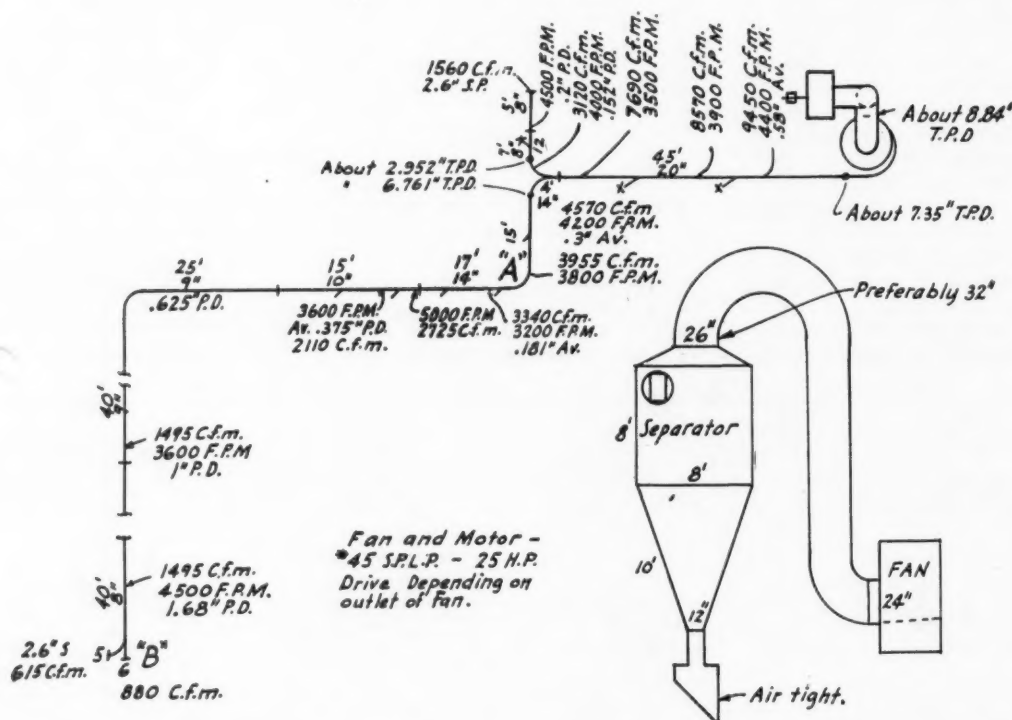
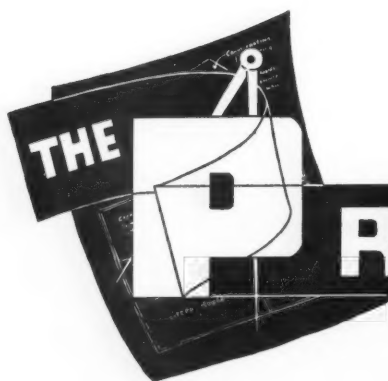


Fig. 1—Layout submitted by a reader. Calculated velocities and resistances have been added. Attention is called to the wide difference in pressure drop between branches—a bad feature.



PROBLEM CORNER

Reversed Flow Through Furnaces

American Artisan:

We are manufacturers of packaged fuel, and are confronted with a serious problem of curing. Inasmuch as water is used in the manufacture of the cube and the wrapping paper is used at the cubing machine while the blocks are still in a putty-like condition, it is most essential for us to remove this moisture reasonably promptly in order to accomplish mass operation.

As normal sales are from sixty tons upward, you can appreciate the floor space required for curing. Our present curing room is sixty feet long by 44 feet wide, and it is going to be a very easy matter to channel this, using four by fours on top of which the blocks will be placed for curing. A breathing space is left between each package.

We have been taking air into our furnaces in the conventional manner and distributing it out the top through ducts down through this drying room. It is our present plan to reverse this operation, placing nozzles at the end of each channel which is made of four by fours laid the full length of the building, receiving the untreated air at the top of the hood and its outlet will be at the ash pit level. Our problem is purely one of heating this air to cause it to receive more moisture. At the far end of the building the air will be removed with exhaust fans.

Can you see any serious objection to either placing a fan on the top of the hood and blowing the air down, or using the blower type and reversing the motion of the fan? The air in each event will be pulled in at the top of the furnace or pushed in at the top of the furnace and removed at the bottom. The air to supply the fans, of course, will be the room air and as we have no circulating problem to contend with, it is purely one of curing these wet packages of fuel in large masses.

F. N. H., Nebraska.

Reply By

S. Konzo, Univ. of Ill.

Fundamentally, I do not see that there is anything wrong with the idea of reversing the flow of air over the furnace so that the air leaves at the bottom of the casing instead of at the top. I have a few comments to make,

particularly in regard to the matter of the heat transfer from the furnace section to the air.

Mr. Wilder raised the question whether the incoming air would not be subjected to the hotter temperatures at first and hence would not be heated after it had passed the mid-section. Furthermore, he conjectured that at least half of the heating surface would serve no useful purpose. In regard to this matter, I believe we have some test data which are of interest.

The following table shows the average heat transmission in terms of B. t. u. per square foot of surface per hour that was obtained for three different types of furnaces tested in the Mechanical Engineering Laboratory at the University of Illinois. The test results have been reported in Bulletin 141, Chapter 12, pages 83-94. Please note that the following values were obtained for combustion rates of 7.5 pounds per square foot of grate surface per hour.

Table Showing Values of Heat Transmission from Each Square Foot of Heating Surface

Type of Furnace	Firepot	Combustion Chamber	Radiator	Ashpit
Circular Cast Radiator	Anthracite 8300	4500	1700	1300
	Bituminous 4900	5500	1600	400
Steel Crescent Radiator	Anthracite 2100	3800	2000	700
	Cast Crab Anthracite 8300	3600	1600	1300

It may be noted that the hotter portion of the furnace in the case of the circular radiator furnace was the firepot section. The same was true for the crab radiator furnace. In the case of the steel furnace, due to the firebrick lining around the firepot, the hotter portion was in the combustion chamber immediately above the firepot. In every case it should be noted that the radiator section was cooler than were the firepot or combustion chamber sections.

In other words, the flow of air would not be subjected to a gradually decreasing temperature as the air traveled from the top of the casing towards the bottom. After the air had passed the firepot section, there would be some tendency towards a cooling of the air in the ashpit section. How-

ever, the surface is small and the cooling effect will probably be negligible. The data which have been summarized justify your proposed plan of reversing the flow of air through the furnace.

There is one other item of interest in this connection and that is the gravity heat against which the fan would have to operate. The data presented in Bulletin 246 shows that the total suction produced by a gravity furnace at the inlet to the casing is of the order of 0.02 inches of water. This pressure against which the fan would have to operate is so small that for all practical purposes it may be neglected. I do believe that in every case of this nature a positive pressure type of blower is essential.

Reply By

J. E. Maynard, Fox Furnace Co.

We have had no experience along this particular line of work; however, we are pleased to pass along such thoughts that may be of benefit to you.

As we understand it, your problem is one of a dehumidification nature, and circulating warm air over the blocks is the proper method. After the air passes over the blocks and the moisture is collected it should be exhausted from the room. No room air should be returned to the furnace due to the high moisture content; outside air should be supplied for heating and circulation. Recirculated air may be used provided some means of dehumidifying the air before it enters the furnace is available. It seems that the nozzles or outlets for the warm air should be placed at the floor line and exhaust the air at a high velocity, possible 800 to 1000 feet per minute.

We are not in a position to state definitely, which is the most efficient and satisfactory method of connecting

the return air to the furnace, i. e., at the top or at the bottom. One thing certain is that a centrifugal multi-blade type blower should be used to deliver or force the air through the space occupied by the blocks. There is a possibility that bringing the air in at the top and exhausting it at the bottom of the furnace might prove more efficient. The blower might have less resistance to contend with and the higher temperature at the base of the furnace might have some bearing on heating the walls of the ashpit sufficiently to assist in heating the draft air which in turn should improve the combustion of the fuel. Bringing the air in at the top of the furnace might tend to create greater turbulence of the air with consequently a greater heat pick up from the castings.

The foregoing represents the writer's personal opinion and may be taken for what it is worth.

Reply By
T. W. Torr, Rudy Furnace Co.

There is no reason why you cannot reverse the air flow through the casing as you have indicated and get a good result. In Mr. Wilder's letter he has suggested that this was contrary to the construction of the heater, which is very true as long as the furnace is used in gravity installations where the heating of the air in the casing by the furnace produces the head which causes the flow to the system. As long as you are going to operate with a fan and will, no doubt, blow a considerable volume of air through the casing which will build up a pressure inside the casing, you will get a very satisfactory heat transfer.

We have made one or two applications of this kind and find there is no difference in heating the volume of air which passes through the casing whether the delivery is made at the bottom of the casing or at the top. You will, therefore, have no difficulty in getting a satisfactory result in this way if it suits your purpose better.

I would suggest, however, in your choice of fans that you use the true centrifugal fan. The reason for suggesting this type of fan is because they are designed to move a considerable volume of air against any reasonable static pressure. You will find that the constant speed curve for the type of fan that I have suggested will show a higher volume of air against an increase in static pressure than either of the two you mention.

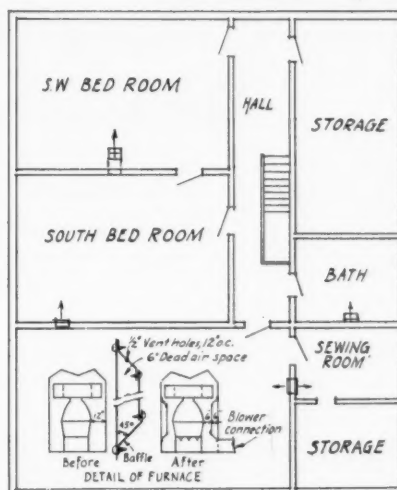
Placing a direct connected propeller fan in the top of the hood would result in the fan bearings being affected by the radiant heat from the furnace castings. This might cause you considerable trouble.

With this letter I am enclosing a sketch suggesting how the fan application can be made.

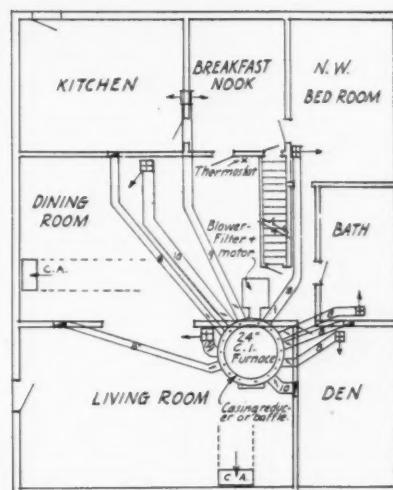
If you care to send me the volume of air that will have to be moved and

some idea of the installation so that the resistance of the flow can be calculated I would be very glad to suggest the size of fan, together with the motor required to carry the load.

A Baffling Baffle Problem



SECOND FLOOR



BASEMENT & FIRST FLOOR

American Artisan:

Followers of your Problem Corner may be interested in an experience of ours with furnace baffling. Mr. Haskell, editor of the Kansas City Star, called the writer in on a trouble job where the heating plant in one of Mr. Haskell's rented houses was giving trouble. Mr. Haskell had tried every suggestion offered over a period of several years until a sheet metal dealer installed a blower on the furnace. An automatic power oil burner furnished the heat, governed by a thermostat. The blower came on and off by a furnacestat in bonnet.

So far, so good, but only the living room and dining room heated, due to the thermostat's location in the dining room.

After two months of playing with the system Mr. Haskell had reached the conclusion that hot water heat was the only satisfactory system, but due to a mutual friend, the writer was asked for suggestions and a price to heat the entire house satisfactorily.

We found all warm air dampers wide open on long and short pipes alike, and, as generally is the case, the 12-inch pipe running straight up from the canopy to the living room and the 10-inch pipe serving the dining room which contained the thermostat took all the heat. It is easy to see why other distant rooms were cold.

We found the distance from the upper edge of fire bowl straight out to the casing to be 12 inches and as this was a 26-inch cast furnace, we had 12 inches all the way around, resulting in unheated air going up most of the side canopy pipes.

We reduced this distance to 6 inches by using a baffle placed to extend from the grate level to within 4 inches of the underside of the radiator.

This baffle was closed at the top and bottom and metal screwed to the outer casing. About fifteen 1/2-inch holes were punched in the top and bottom plates as vents, as shown on page 307 of the 1934 A. S. H. & V. E. Guide.

We were forced to close off the dining room pipe damper about 85%. The short living room damper about 60% and so on until we balanced the house. In one southwest bedroom (that had not heated since the house was built, 12 years before) it was necessary to remove one peck of "shavings" at the base of the wall stack in order to get results.

Our alteration included three air filters, which had been left out. The control of blower was also changed to start with a bonnet temperature of 140° and to shut off with the oil burner. A summer switch was included, also.

In judging just how close the baffles should be placed to the furnace, or the free area reduced on a gravity furnace with blower, the writer used four thermometers placed in various rooms and balanced the house to even temperatures. Where we have installed the Miles Fan with side louvres and expected some gravity flow of air we came no closer than 8 or 10 inches to the fire bowl with the baffles. On the other extreme where we used a pressure blower with filters and where no gravity flow was expected and the blower started at 125°, we brought the baffles up to within 5 inches of the fire bowl top edge, due to our using a higher velocity and 6 air changes per hour in the house.

We hardly know how one could improve on the baffling as shown on pages 306-307 of the 1934 Guide.

Arthur W. Hunt,
Kansas City, Mo.



ASSOCIATION ACTIVITIES

Ohio

Announcement is made by the convention committee of the Ohio Sheet Metal and Roofing Contractors' Association and the Toledo Sheet Metal and Roofing Contractors' Association of the Ohio State convention to be held in the Waldorf Hotel in Toledo, August 6, 7 and 8. The convention committee reports that an interesting program is being prepared and that full information will be sent out to all interested parties at a little later date.

A tentative outline of the program shows that on August 6 there will be held a get-together party for the salesmen and exhibitors. On Wednesday night a boat excursion on Lake Erie has been planned for the entertainment of members, wives and guests.

The Ohio Association will stage an exhibit this year at which manufacturers and distributors of all products used in the warm air heating, sheet metal and roofing fields have been invited to display. One month ahead of the convention date shows a large number of exhibit spaces already contracted for. Many of the better known concerns in the heating, sheet metal and roofing business have already taken place.

The convention committee has set as its goal a convention equal in every respect to the last convention staged in Toledo in 1930. Full information may be obtained from J. Dersher, Chairman of the convention committee, 40 Eleventh Street, Toledo.

Milwaukee

The Sheet Metal Contractors' Association of Milwaukee, during the last two monthly meetings, has devoted considerable time to discussions of local Milwaukee and State of Wisconsin laws proposed or recently enacted affecting the sheet metal and roofing industry. In the city of Milwaukee a proposed amendment to the charter ordinance authorizes a Central Board of Purchasers to purchase from all selling agencies without the intervention of a formal contract. The Association has recommended that all members contact aldermen for the purpose of obtaining votes against this proposed legislation.

Bill 9-A, in the state legislature, authorizes any municipality to carry on public works as they see fit, empowering the municipality to practically go into any kind of business. The association has recommended that this bill be opposed.

There is also in the legislature an amendment which will place building and loan associations on an equal basis with banking institutions in executing mortgages. The association recommends that this legislature be approved.

The association has also discussed in detail the United States Security Bill, the Wisconsin State Labor Dispute Bill and the National Wagner Labor Bill. It is hoped that these discussions will enable members of the association to determine just what plans for approval or disapproval should be followed by individuals and by the association as a body.

Paul L. Biersach,
Secretary.

Chicago

The new City of Chicago roofers' ordinance, requiring a \$50.00 annual license fee, has been called up for hearing before the City Council License Committee and has been referred to a special committee for further consideration.

The Furnace and Sheet Metal Institute of Chicago is planning to hold its annual picnic on July 21 at Long Lake, Illinois. A long list of entertainment activities has been planned by the picnic committee. The Institute's school of gravity and mechanical heating continues to enjoy good attendance, particularly among the younger members of the trade.

Indiana

The Indiana Sheet Metal, Warm Air Heating and Roofing Contractors' Association has made a real effort to cooperate with FHA in order that increased business might accrue to members of the Indiana Association, the local organizations and to the industry as a whole. Many of the shops in Indiana are in desperate need of work. Contract shops seem to be doing fairly well and industrial work, both new and remodeling, is on the upgrade. Federal, state and municipal projects have increased steadily in volume during the last two years. Small shops catering to repair work have not had very much increase in business.

The Indiana Association hesitates to endorse prospect lists compiled as a result of FHA and HOLC canvasses. However, the association is recommending that each contractor conduct his own survey and compile lists of prospects from this survey.

FHA in Indiana has recently sent out

a questionnaire asking for information on commercial stores which have recently completed alterations. Returns show that practically every city of any size in Indiana has had several or numerous store remodeling jobs ranging in cost from a few hundred to several thousand dollars. This survey also brought out the interesting fact that in practically every case these alterations have resulted in increases in sales ranging from 10 per cent to 100 per cent. The total expenditure for alterations shown by the survey is almost \$200,000.

The FHA campaign has been endorsed by practically every trade association in Indiana. All such associations have operated on the premise that cost has been the chief stumbling block to commercial alterations. Now that this has been overcome it is reasonable to expect that an increased alteration program will take effect throughout the state.

Paul R. Jordan,
Executive Secretary.

Columbus, Ohio

Members of the Sheet Metal Contractors' Association of Columbus, Ohio, have not been able to note any difference in activities since the abolishment of codes. Perhaps the principal reason is due to the fact that the local code was never adopted by the association and other contractors. The association does not contemplate any radical departure from established customs. The association has a complaint committee to which violations of trade ethics can be referred. The association feels that there is a code in effect in Columbus—though this is an unwritten code. This unwritten code seems to be made up of the rugged individualist strain which resents too much detailed interference with private initiative and the trade in Columbus has been fortunate in having this individualism tempered with voluntary observance of the Golden Rule.

The association feels that the unwritten code is really in operation and that the members are more than mere members since they are, in most cases, real friends.

That this expression of opinion is the opinion of the association as a group rather than of one person is indicated by the fact that the statements given above are sponsored by practically all of the active members of the association.

Harry B. Snyder,
President.

Boston, Mass.

The Building Trades Employers' Association of Boston, Massachusetts, unanimously adopted at a mass meeting held in Boston, May 9, a preamble and resolution to be distributed to all executive heads of national, state and municipal governments as well as to other national affiliated groups. In brief, the resolution points out that the most effective agency to lead to a general business recovery is the construction industry, which is the second largest industry in the country and one of the greatest creators of permanent wealth. Stimulation of this great industry is essential and vital. The resolution endorses the work relief bill.

The purpose of the resolution is to urge the greater use of federal funds through the building construction industry to secure the maximum efficiency and economy in unemployment relief. The resolution points out that considerably more actual employment can be furnished when wasteful abuses and inefficient conduct of work are eliminated. The money thus saved will provide additional hours of employment for skilled and trained mechanics and taxpayers will be given far more value for the money expended. The resolution endorses the planning and carrying on of such work by experienced and qualified architects, engineers, contractors, mechanics and laborers.

The resolution further points out that federal, state, county, city or town competition with private building enterprise is decidedly destructive, especially where such work places unskilled labor at jobs which should be handled by skilled mechanics.

The Building Trades Employers' Association has petitioned for immediate action by the heads of all governmental departments in order that the building industry as a whole, which has suffered so severely from the depression, can provide employment for contractors and mechanics.

John F. Walsh,
Secretary.

St. Louis, Mo.

The Associated Sheet Metal, Air Conditioning and Heating Contractors of St. Louis, Inc., at their June meeting, listened to an address by R. W. Baker of Republic Steel Corporation, Youngstown, Ohio, on the manufacture, performance records and applications of stainless steels and special metals. Approximately 150 contractors attended the meeting.

Wallace Cavallo,
Secretary.

Indiana

The Elkhart-South Bend district of the Indiana Sheet Metal, Warm Air Heating and Roofing Contractors' Association held a meeting June 21 at South Bend. Tom McConnell of the Indiana State FHA and several other speakers were included on the program. Chairman J. A. Harris recommended that the state association maintain the gains made under NRA and endeavor to extend such benefits. Chairman Harris emphasized the

need for continual education on the part of the furnace and sheet metal contractor, pointing out that this industry is in a state of change as compared with other building trades where practically no progress has been made in recent years. Mr. McConnell pointed out the vast market available to contractors co-operating with FHA in securing contracts for remodeling and repair work. The speaker declared that out of the thousands of loans made in Indiana not one is in default.

Cleveland, Ohio

The Warm Air Furnace and Air Conditioning League, Inc., of Cleveland, Ohio, on May 6 held a charter closing party in the Hollenden Hotel. All known furnace and sheet metal contractors were invited and practically every firm in the city attended. Jobbers and manufacturers were also invited, resulting in a total attendance of some 275 persons—260 being contractors. As a result of this meeting, the League was able to increase its membership until practically every con-



Standing—L. D. Mather, C. F. Ormston. Seated—D. A. Fisher, Wm. Fingerhut.

tractor in the district is a member of the League.

President William Fingerhut outlined the purposes and plans of the League since its inception and pointed out the numerous things which it has accomplished. President Fingerhut explained in detail the advantages of co-operation, how contractors can meet their competitors and become friends, resulting in a better understanding between all members of the League. Manufacturers and jobbers in attendance voiced their appreciation and endorsement of the plans of the League and extended their best wishes for future success and assurances of complete co-operation.

D. A. Fisher,
Secretary.

Albany, N. Y.

The Capitol District Roofing and Sheet Metal Contractor's Assn. of Albany, has tried to get something started through our

local association, but our attention has been given to establishing a labor rate by signing an agreement with the local Union. This is progressing very slowly due to the fact that the members of the industry in this section do not attend the meetings that are called.

While the code was in effect and we had a bid depository throughout the state one might have imagined that the low bidder on the roofing would have only to walk in to the owner or the successful general contractor and receive an order for the roofing. However, in 50% of the cases where school houses and other types of public buildings were bid upon, the low bidder did not get the work. Of course the general contractor and the successful roofer used very protective language and explained how the contractor was willing to spend in some cases \$800 or \$900 more for the roofing. Of course, since the codes have been out of order there has been a little more chance for a few "honest guys" to get in and do a little chiseling too.

It is difficult for us to see how regulations or ethics that can be created for national business would control the selling end of the roofing industry.

James F. Keays,
Secretary.

Houston, Texas

The Houston Sheet Metal Contractors' Association has never actually subscribed to the code of fair trade practices, but an unwritten code has been in effect among members for a considerable period of time. The association hopes to conduct a membership campaign to strengthen the organization. Recently a get-together meeting and dinner was held and although the number of new firms taken into the association was not large, some progress has been made.

Houston has its fair share of chiselers and cut-price operators and the association is endeavoring to raise the general level of prices and eliminate through association efforts such unfair practices as are detrimental to the business as a whole. Unfair practices have never ceased to exist in the Houston area despite the code and the only means which seems to stand a fair chance of eliminating such practices is through association efforts. This goal has been the aim of the association for a number of years.

Harvey Hutchins,
Secretary.

Rockford, Ill.

Contractors of the Rockford Sheet Metal & Furnace Contractors' Association have been endeavoring to secure passage of a local furnace ordinance covering installation of gravity and mechanical heating systems. The Rockford City Council has questioned the right of the city to pass such an ordinance, but the association has been able to explain that similar ordinances are in effect in other Illinois cities and, therefore, the association hopes that passage will be secured this year.

Alga Reece,
Secretary.

A Roof Jack Pattern

By L. F. Hyatt

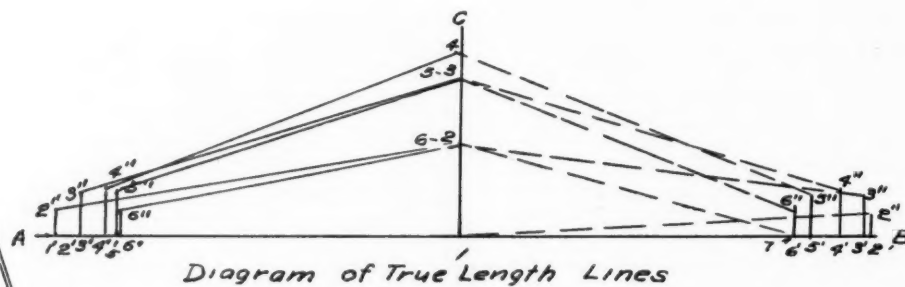
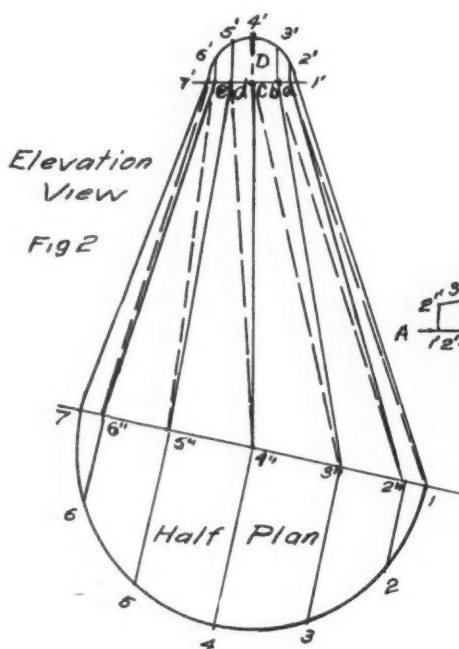
Contributing Editor

THE roof jack problem was submitted by an ARTISAN reader in Michigan. The dimensions are giving in Fig. 1. The roof has a rise of 5 inches for each 12 inches of span. The opening at the top and bottom are circular in shape. In drawing the full size pattern it is of course necessary to divide the half plan into more than

six spaces as was done with the half plan view in Fig. 2. The same is true of the half plan view of the small end of the roof jack D.

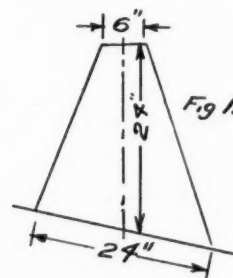
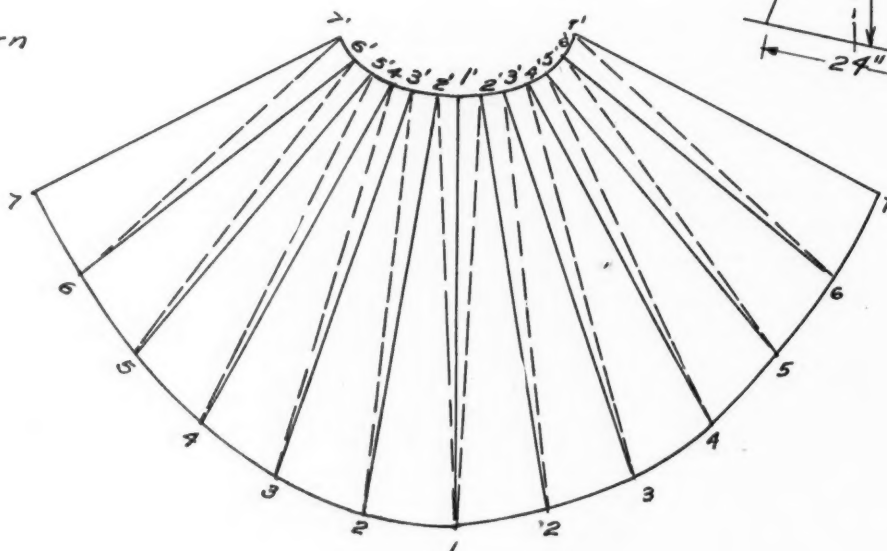
A simplified method is used in developing this pattern. Only half plans of the openings are necessary with problems having the two halves exactly the same size and shape.

Begin by drawing the 24 inches vertical line, at the top draw the horizontal line, and upon this line construct the half plan of the small opening. Divide this half circle into 6 equal spaces and number 1', 2', 3', 4', etc., as shown. Drop lines from these numbers until they strike the straight lines 1'-7'. Now draw the line the desired slope of



ROOF JACK.

Pattern



the roof, in this case 5 inches rise to each 12 inches of span. Upon this line construct the half circle representing the opening at the large end of the jack, and number all points on this half circle as shown in the half plan Fig. 2, and draw lines from the half circle until they strike the straight line, locating 2" 3", 4", etc. These lines are drawn at right angles to the line representing the slope of the roof. Draw lines connecting 1' with 1, 1 with 2', 2' with 2, 2 with 3', 3' with 3, with first a solid line and then a dotted line. Continue in this manner until all lines are drawn, thus completing the elevation view, Fig. 2.

The lines 1-1' and 7-7' are the only lines on the elevation view that are shown in their true length, so it is first necessary to find the true length of all other lines before the development of the pattern can be begun.

First draw the horizontal line *A-B* as shown in the diagram of lines. From point 1 draw the line 1-*C* of indefinite length, and on this line step off the distance 2-2" found on the half plan elevation view. Do the same with the other distances found on the large half circle thus locating points 4, 5-3, and 6-2.

It will be noted that the lines are alternated dotted and solid in the elevation view, this being done of course to avoid confusion when constructing the pattern. Now take the distance from 1 to 2' found on the elevation view and step it off

from point 1 at the base of the line 1-*C*, locating point 2' on the line *A B*. From point 2' just found erect a perpendicular line of indefinite length and upon this line step off the vertical distance from 2' to a point on profile *D*, on the vertical line just drawn, locating 2".

Now draw the dotted line from this point to point 1. This is of course the true length of the dotted line 1 to 2' found on the elevation. Next take the distance 2 to 3' found on the elevation view and step this distance off from point 1 on the line *A B*, thus locating the point 3', and from this point erect a perpendicular line and step off the vertical distance from 3' to *b* found on profile *D*. Now draw the dotted line from this point 3" to point 2 found on the vertical line 1-*C*. Continue in this manner with all the dotted lines found on the elevation view. It is of course necessary to find the true length of the solid lines with the exception of 1-1' and 7-7'. This is done in the same way as with the dotted lines as may be seen by a careful study of the diagram of lines.

Having completed the diagram of lines, we may proceed with the development of the pattern. Care must be taken not to use a line out of its regular order. First draw the line 1-1' of the pattern the length of the line 1-1' found on the elevation view. This is one of the two lines found in true length on the elevation view.

Now with point 1 on the line 1-1' as a center, and the distance 1 to

2" found on the dotted line group of true length lines strike an arc of indefinite length. Then with 1' as a center and the length 1' to 2' found on half profile *D* on the elevation view as a radius, strike an arc intersecting the arc previously drawn locating points 2' on the pattern. Since both halves of the pattern are alike the lines are drawn each side of the center line.

Now with the two numbers marked 2' on the pattern as centers and the distance 2 to 2" on the diagram of solid lines as a radius, strike arcs of indefinite length. Take the distance from 1 to 2 on the large half plan and with 1 as a center strike arcs locating the two numbers 2 on the pattern, one on each side of point 1. With the distance 2 to 3" found on the dotted lines in diagram of true length lines, and with 2 on the pattern as centers strike arcs.

From half profile *D* on the elevation view take the distance from 2' to 3 and with the numbers 2 on the pattern as centers strike arcs intersecting the arcs previously drawn, thus locating points 3' on the pattern.

Continue in a like manner with the other true length lines until 7-7' is to be used. This line is found in its true length on the elevation view and is used as the last line of the pattern. No allowances have been made for laps, seams, etc. It is important that care be used in accurately finding the true length of the lines, as well as using them in their proper sequence.

Data Sheets For Casing Baffling

(Continued from page 15)

at somewhat higher velocities than occurs in gravity operation, it is essential that the air spaces be restricted—otherwise some of the air might get through without picking up heat. The sketch shows our usual method of applying the baffles."

Number 8

T. W. Torr, Rudy Furnace Co., Dowagiac, Mich.

"On steel furnaces we generally suggest a continuous, blocked-off top and bottom baffle box which follows the

contour of the casing and reduces the air passage about 50 per cent at the radiator. We have found that this type of baffle works well with either the short or long wrap type of radiator. The purpose is to bring the air into close contact with all hot surfaces."

Number 9

E. H. Carr, Mid-West Heating Co., Indianapolis, Ind.

"On round cased, steel furnaces we usually try to block off the large open

area in front of the radiator. It is through this space that much of the unheated air tends to pass. The sketch (Number 9) shows the type of boxed baffle we use. The idea is to so restrict this area that the space between baffle and drum is equal to the space between inside edge of radiator and drum. The baffle starts at the top of the radiator and extends down about 30 inches. The top and bottom are solid so that air does not pass through the baffle box. We have found this plan efficient and at the same time miserly of materials and labor."



Why Not Let Your Mechanics SELL?

By a Shop Owner

SHEET metal contractors who own shops that employ one or more men are confronted with the problem of unemployment, as are executives of large industrial corporations. Moreover the proprietor of a sheet metal shop is just as interested in keeping his help steadily employed as any large corporation.

However, there is a way he can do this and at the same time make more money for himself. That way is by increasing sales.

Perhaps you have already started concentrating on a better selling program, but because almost everyone is a careful buyer now, you find it impossible for one man to get enough orders to keep all your help busy or make even a fair profit for yourself.

The logical solution to this condition is more salesmen. However, conditions do not warrant an increase in personnel but you can do the next best thing. Make salesmen of your employees.

This idea may sound a little impractical to you at first. Most every-

one thinks of a salesman as being a well-dressed, smooth-talking individual—not a shop man. But workmen can sell. The very fact that they aren't always immaculate in their dress often makes it easier for them to get business from another working man. And it is the orders from this class of home that keeps most shops busy.

Enlisting workmen to get business is not a new idea. Lately it has been used successfully by many companies who realize business is obtained only through interpreting the advantages of the product in terms of service to the prospective customer, and by continually asking for orders.

An Example

A salesman representing a weatherstrip company called on a prospective customer and interested him in the product but did not get his name on the dotted line. Later, a workman for the same company followed up this call. He told the prospect why his weatherstripping

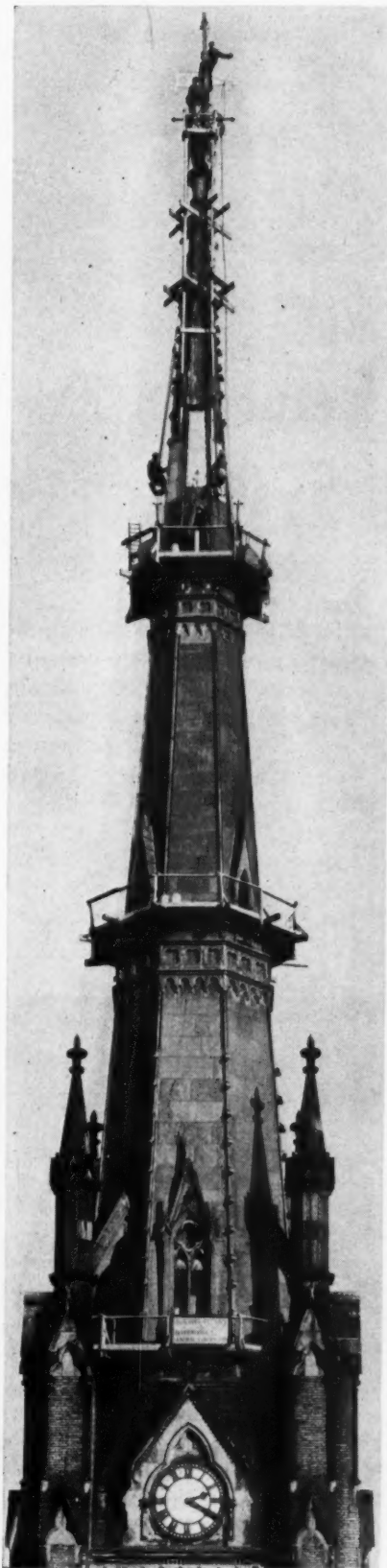
was better than any other, just as the regular salesman had done. He went a step farther and pointed out the things he did while making the installation that assured satisfaction. This impressed the customer so much that he bought the weatherstripping job on the condition that the work be done by the man who sold him. He even went so far as to call the district office, thirty-two miles away, to make the necessary arrangements.

Then there is the experience of an eastern coal company. They started a sales contest among their white-collared employees and it proved very successful. The president of the company suggested the contest be extended to include the drivers—the men who deliver the coal and shovel it into the basements. Immediately many objections were raised but the idea was carried out. And it was successful! In a few cases the drivers got more orders for coal than some of the full time salesmen. Moreover, everyone in the organization realized that sales were the keystone of the company's success and that sales meant work for them.

Surely, if these men can get business, sheet metal workers can do likewise. Their chances of success

(Continued on page 74)

Re-sheath St. James Cathedral Spire, Toronto, Exactly Duplicating Old Metal Work



Construction view with lower two thirds completed.

IN THE year 1793 the trading post at what is now Toronto, Canada, was made a garrison town and named York in honor of the Duke of York, son of George III. Because most of the troops and settlers were from England, Church of England services were begun in the Government House. In 1803 a meeting was held and plans laid for a church—finally completed in 1807 and named St. James' Church. Fire destroyed this building in 1818, a new church was outgrown in 1831 and the stone edifice which replaced it was burned in 1839 as was the next church in 1849. The present church which has been the cathedral since its erection was completed in 1853.

The Cathedral of St. James is said to be one of the finest examples of early English Gothic architecture in America. Its total length is 198 feet and its width 98 feet. The tower is 30 feet square and rises 324 feet above the street.

Preliminaries

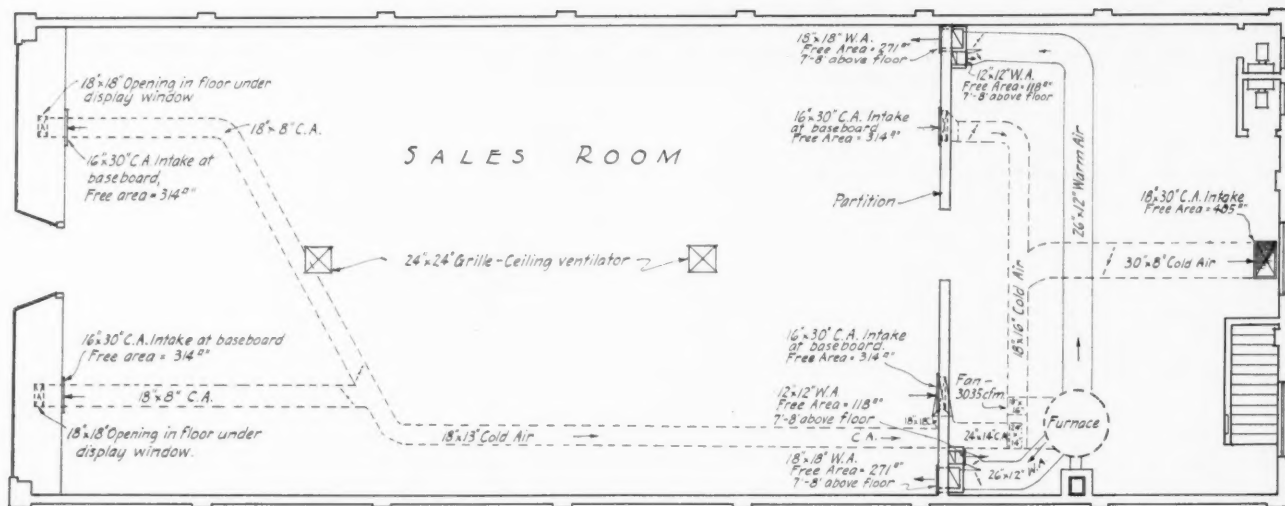
Last fall it was deemed advisable to remove the old galvanized iron sheathing on the spire and replace the metal with copper. The contractor was Building Repairs and Alterations, Ltd., Toronto. The work consisted of removing the old iron and installing copper which exactly duplicates the original metal work. Six weeks were required to erect scaffolding, strip off old iron, fabricate and install copper, remove the old weather vane and install a new one and remove all staging and debris. Three steeplejacks, four sheet metal mechanics and some carpenters were used during the job.

As explained by the contractors the first operation consisted of making a survey to determine conditions and the making of working drawings based upon actual job measurements. The engineers decided that three scaffolds—one at the base, one just above the middle moulding and the highest above the

(Continued on page 72)



The finished spire, covered in copper, exactly duplicating old metal work.



FIRST FLOOR PLAN - HEATING SYSTEM IN BASEMENT

Rear Supply-Front and Rear Return-In A One-Floor Store Heating System

H EATING store buildings is always interesting — but has become especially so since the "Modernize Main Street," F. H. A., H. O. L. C. and other improvements got under way to stimulate remodeling and new construction. Also, it has been interesting to note that lately the chain stores have begun to remodel their owned and leased buildings to the end that greater customer comfort and attractiveness may be used as a patronage stimulator.

In Pontiac, Michigan, there was finished last winter a chain store installation in a new building on an old site which illustrates very well how a really simple forced air system may be used to bring the store's heating up to date. The building is one story and basement with double show windows and a central doorway. The concrete first floor is supported on lattice type, light weight fabricated beams with main I-beams and pipe columns running the long way of the building.

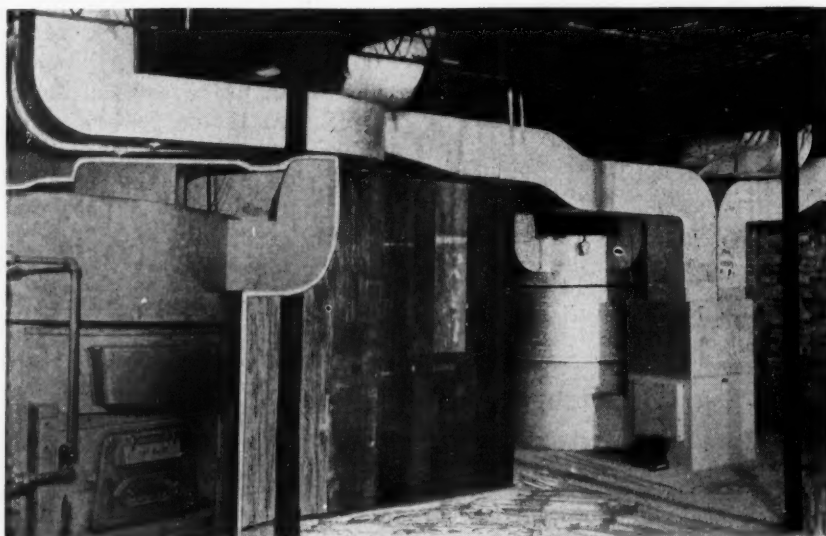
The heating contractor—A. Elbling and Sons of Pontiac, designed a system using one furnace and a comparatively short supply system with registers located 7 feet 8 inches above the floor level and pointing toward the front of

the store. The cold air is withdrawn at the floor level in the center point of each of the front windows and also at the floor line in the partition where the warm air registers are located. This gives two warm air registers and four cold air returns in the main store. Two smaller warm air registers and one cold air return serve the work space behind the partition.

The fan blows 3,035 c.f.m. through the two main warm air

trunks, which are the same size. The plan calls for two main ducts each 26 by 12 inches or a total of 624 square inches or $4\frac{1}{2}$ square feet of duct. The velocity through the duct behind the registers is, then, around 700 feet per minute. The total square inches of register face is about 450 which, at 70 per cent efficiency, just about maintains the duct velocity through the register.

All duct work is rectangular, (Continued on page 72)



The plan above shows arrangement of supply and return grilles for main store and rear room, location of furnace and blower and the duct system. Below is a composite photograph showing a basement view of the furnace with a front view of the furnace set in the picture.



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AMERICAN ARTISAN

Air Conditioning Section

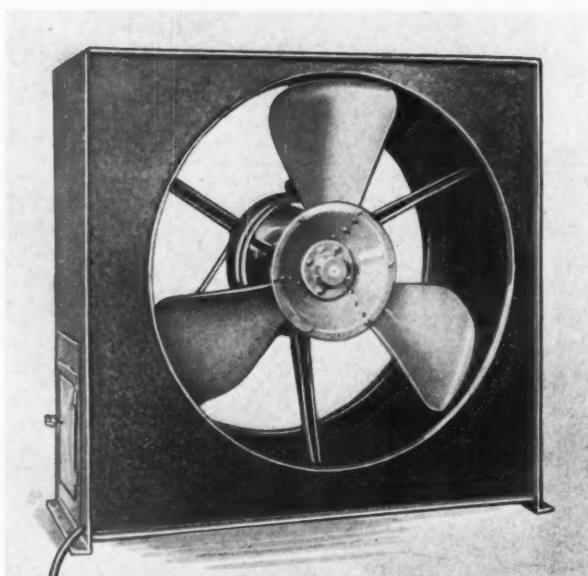
**Devoted to the technical and merchandising problems
of air conditioning in homes and small buildings**

IT WOULD be extremely interesting to know, if a survey could be conducted, what type of sales or engineering agency is getting most of the small commercial cooling work which is going in this summer.

- - - So far as we can judge from a few trips into the field and from correspondence such work is now divided between heating contractors of all kinds, ventilating contractors, specialty sales agencies and the direct sales or engineering offices of equipment manufacturers.

- - - The important fact, to our mind, is that such work can be done by contractors from our industry—is being done at excellent profit returns—where our contractors are alive to the possibilities. We have one big advantage—we can recommend several types of systems such as water, ice, refrigeration, whereas the special agencies generally can recommend only one type.

- - - If you are not now doing commercial cooling work we strongly recommend that you look over the work going into your area, that you study present and future prospects and begin this summer to study the possibilities.

NEW!**a really QUIET
Attic Fan**

These three large blades move a large quantity of air, quietly.



Drive side of the Buffalo Attic Fan.

At last—here's a fan you can sell your most critical customer with the certainty that there'll be no complaint about NOISE! We designed this fan especially for attic service—and it's QUIET.

Belt-driven at a speed suitable for the most practical operation, this fan handles ample air for the average home.

Fan and motor are insulated from the metal casing by means of floating rubber mounts. Ball bearings carry the fan shaft.

Housing is welded; finished in beautiful, durable, "crinkle" black. Fan is a three-blade high-efficiency type.

This is a self-contained, complete unit and there is practically no installation expense. We have a new bulletin at the printers which shows how easily these fans can be installed and how satisfactorily they perform. If you are interested,

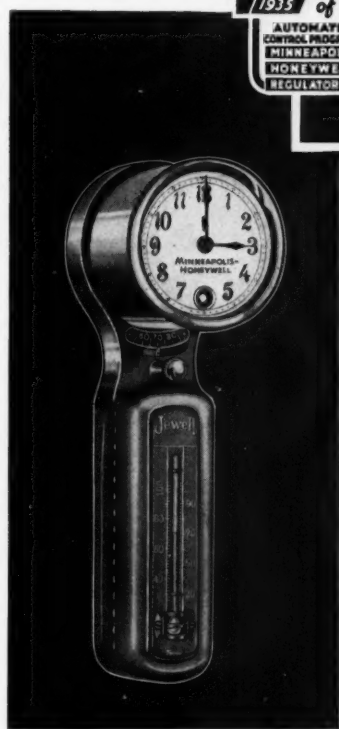
Write for New Bulletin

BUFFALO FORGE COMPANY
497 Broadway Buffalo, N. Y.

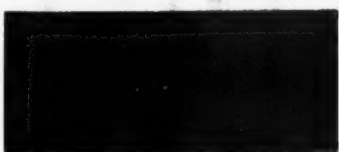
In Canada: Canadian Blower & Forge Co., Ltd.
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Sell Hot Weather
COMFORT

The Standard Electric
Janitor Package with
the New Heat Lev-
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THE "HEAT-LEVELING"—
CLOCK THERMOSTAT which
automatically lowers and restores
temperature at any predetermined
hour to conserve fuel. Furnished with
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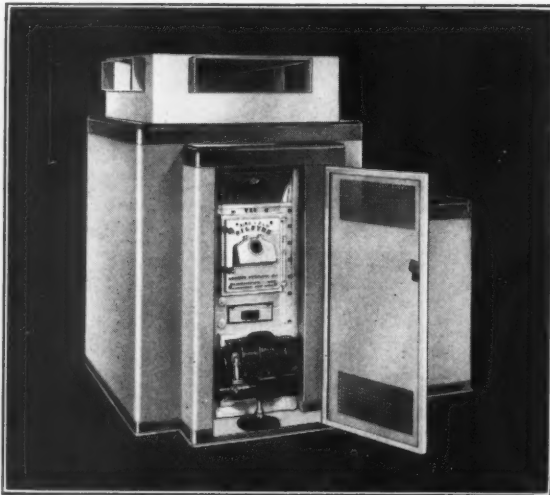
NEW COMFORT. New Economy. Both are now available to users of hand fired heating plants with the new Minneapolis-Honeywell Electric Janitor, with the sensational and revolutionary **Heat Leveling** thermostat. This new type thermostat operates on a proved heat actuated principle. When the thermostat calls for heat, a small metal heat retainer or "sponge" is electrically heated. This causes the thermostat to close the drafts before overheating can occur. The "sponge" also provides a minimum "on" period (from 6 to 14 minutes depending upon adjustment) and assures the generation of sufficient heat to circulate. Thus the Electric Janitor **Heat Leveling** thermostat eliminates both under-heating and over-heating and provides leveled temperature at all times. With all its improvements, the Electric Janitor Package has a **new low price**. For complete information write Minneapolis-Honeywell Regulator Company, 2726 Fourth Avenue South, Minneapolis, Minnesota.

Branch and distributing offices in all principal cities. In Canada: Minneapolis-Honeywell Regulator Co., Ltd., 117 Peter Street, Toronto. European sales and service: 233 Heerengracht, Amsterdam, Holland.

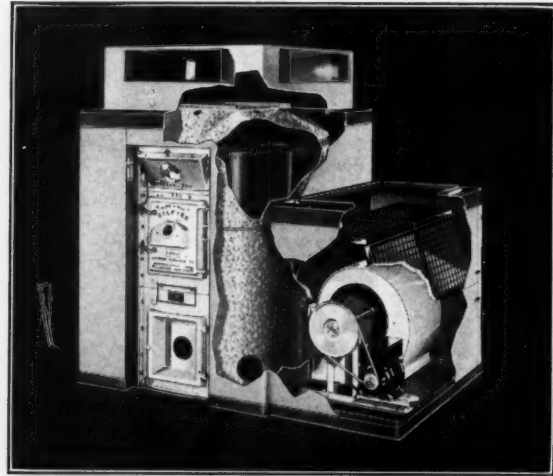
MINNEAPOLIS - HONEYWELL
Control Systems

BROWN INSTRUMENTS FOR INDICATING AND RECORDING

LENNOX AIRE-FLO AIR CONDITIONING UNITS SET NEW STANDARDS

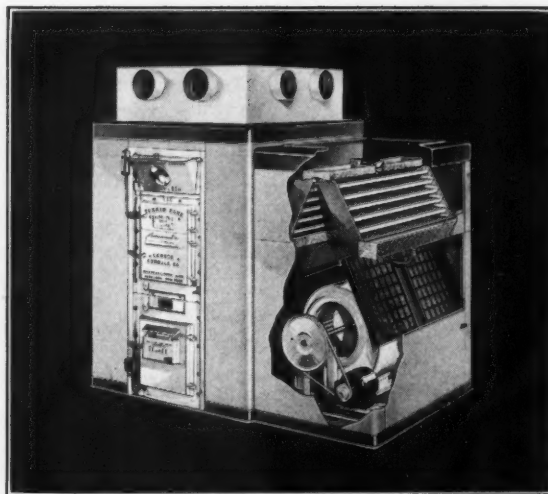


C-Series unit with Vestibule to enclose furnace front and burner.



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The simplest of
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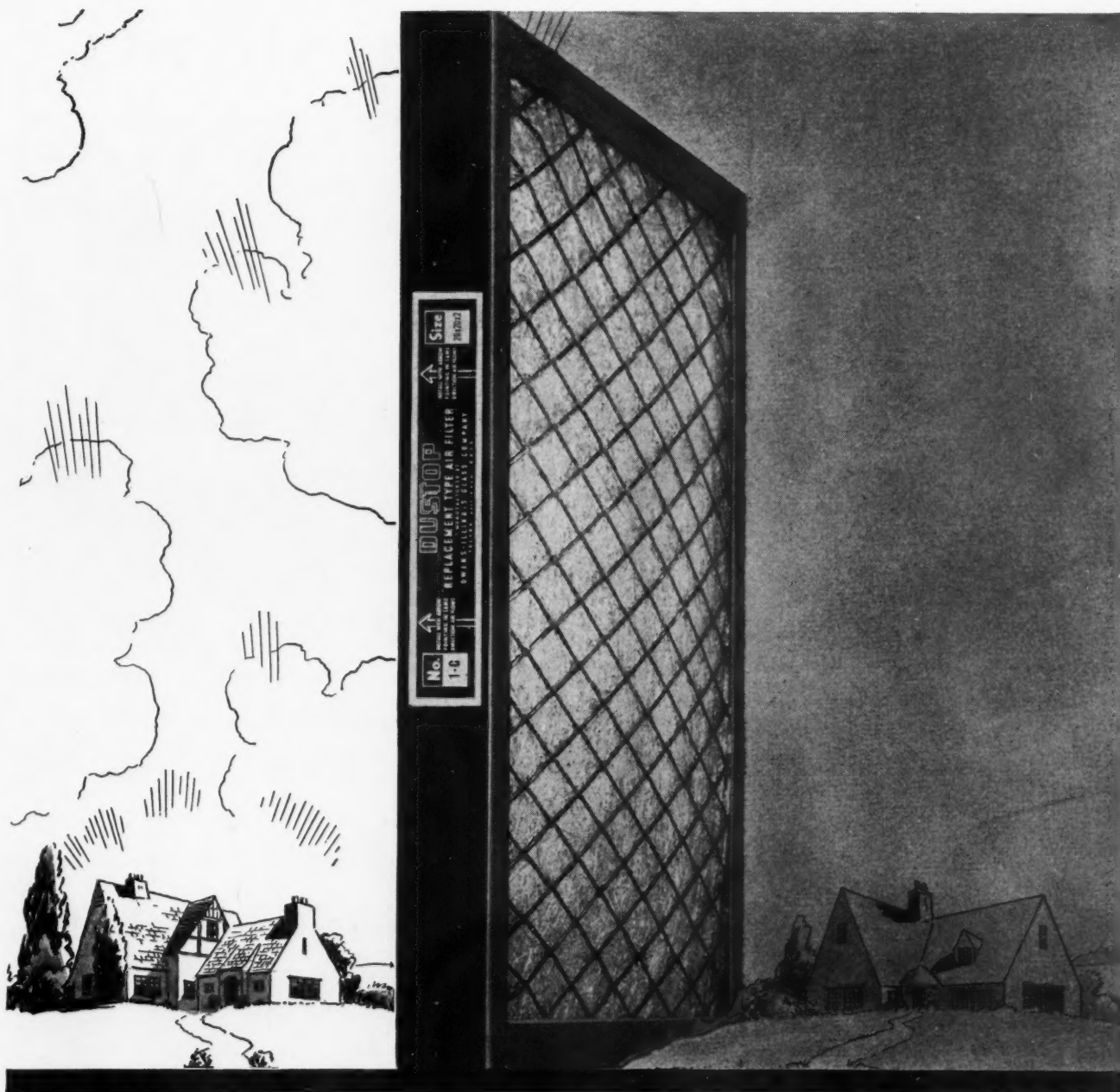
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● The cost and expense of dust are tremendous. Everywhere throughout the nation people are becoming aware of the great menace of dust. Newspapers have publicized to the limit the recent dust storms. On all sides you hear of disease, filth and hay fever pollen carried by dust. America truly is dust conscious. Sell

clean warm air and you will make the most of the steadily increasing consciousness of dust. And when you sell clean warm air, be sure that you recommend Dustop replacement-type filters—the efficient, low cost replacement filter. Owens-Illinois Glass Company, Industrial Materials Division, Newark, Ohio.

OWENS-ILLINOIS

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AIR FILTERS

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A DIFFERENTIAL THERMOSTAT HAVING BOTH A NORTHERN AND A SOUTHERN RANGE



"GENUINE DETROIT" No. 691
DIFFERENTIAL THERMOSTAT

THE first differential thermostat with both a Northern and a Southern range is now available. It is the "Genuine Detroit" No. 691.

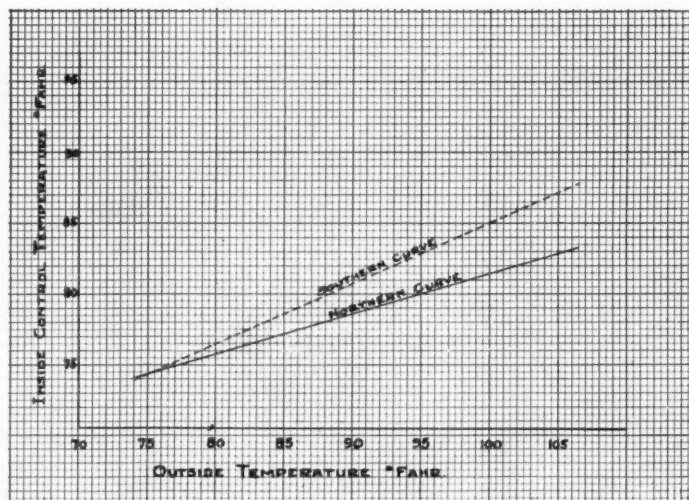
When used in the North, the No. 691 controls indoor cooling in accordance with the A. S. H. V. E. "Comfort Curve".

But in the South, where higher humidities are encountered, hot weather comfort demands higher temperatures indoors than those represented by the A. S. H. V. E. curve. The relationship of the two comfort curves is shown on the accompanying chart.

The "Genuine Detroit" Differential Thermostat No. 691 for use in the South controls room cooling through the temperature range indicated by the upper curve on this chart. This instrument is the only one which makes possible a double temperature range.

The temperatures represented by these curves may be shifted slightly up or down by a simple factory adjustment to meet some individual condition. The adjustment changes all points on the curve equally.

For full information on the No. 691, write for Technical Bulletin No. 74-A.



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Engineers using a draft gage and CO₂ recorder on a test installation.

Introduction

THE calculation of pressure losses in a duct system is at best a process of approximations. Very precise methods of estimating pressure loss are available, and should be used in the case of large ventilating duct installations where improper estimates would involve wasteful operating expense and wasteful use of equipment. In the design of the Holland Vehicular Tunnel, for instance, where decided peculiarities in duct sections made the calculation of pressure losses an extremely difficult one, Professors Willard and Kratz built large-scale models of the tunnel to determine the proper values to be used in the design of the tunnel. Thousands of dollars were spent by the New York Commission to determine these pressure losses; in return for which they were able to obtain the data which was necessary to size the ducts, air inlets, and fan housings with a minimum allowance for unknown factors of safety. Not only were the tunnel engineers able, therefore, to put in the proper size of equipment to do the job, but they were able to reduce the operating costs of the fans from that which would have been necessary if the data on air resistance had not been obtained. The movement of air against resistance takes power, and power costs money; that is one of the fundamental axioms that underlies every ventilation or duct system.

It is a far cry from the immense Holland Tunnel ventilation system to the average domestic, forced-air heating system and yet to a very great extent the same principles of design apply equally well to both types of installations. It is the purpose of this and succeeding articles to explain some of the factors which govern air resistance and to discuss some of the assumptions which are made in the design of a duct system.

Forced Air Heating Facts From The Research Residence

Pressure Losses in F. A. Systems

(Part I)

In this article, the eighth of the series, the author has temporarily abandoned the discussion on test results to devote some time to an explanation of the terms encountered in air flow and ventilation work. Test results about pressure losses in a forced air system are comparatively meaningless unless the reader is at least partially familiar with the terminology, the unit and the limitations of air flow work in general.

By S. Konzo

Nature of Velocity Pressure

What is velocity pressure? Engineers glibly refer to the terms "velocity pressure," "static pressure," and "total pressure," and installers soon pick up the jargon, often without fully comprehending the nature of the pressure nor the manner in which each can be measured.

These pressures can be most easily visualized in terms of the flow of a fluid which is more tangible than air. In fact, the principles of fluid motion can be generalized and are equally applicable within limits, whether the fluid be air, water, oil, molasses, or hot asphalt. For purposes of analogy we shall refer to water instead of air; and our visual picture will be in terms of that liquid fluid.

Now suppose that we imagine a case in which water is flowing in an open trough or channel. That water has velocity; it moves; it can carry along with it other particles suspended in the water. If we should suddenly cap our hand over the end of the trough we would feel exerted against our hand a force, which is designated as velocity pressure or velocity head.

Velocity Head or Velocity Pressure (abbreviated to V.P.) is defined as that pressure which is required to create the velocity of flow. Velocity pressure is dynamic, in the sense that it involves a movement of the particles composing the fluid.

In a similar manner, we intuitively feel that a jet of air from an air jet creates a large velocity pressure; whereas a mild breeze from a desk fan creates a much smaller velocity pressure. The former pressure may be sufficient to move a small book; the latter pressure may be sufficient to move only a sheet of paper. In fact, as an exceedingly rough index, the velocity pressure might be stated in terms of the moving effect created by the air motion. Such an index is hardly adequate for precise engineering work, however, and a more direct method of measuring air pressures would be desirable.

Measurement of Velocity Pressure

When we capped our figurative hand over the imaginary trough and stopped the equally imaginary flow of water, we were in fact following the same procedure as that used in making measurements of velocity pressure. An instrument called a pitot tube (pronounced pea-toe) is placed parallel to the air stream and pointed against the stream of air, as shown by the sketch in Fig. 2. The air impinges on the open end of the tube and is completely stopped, with the result

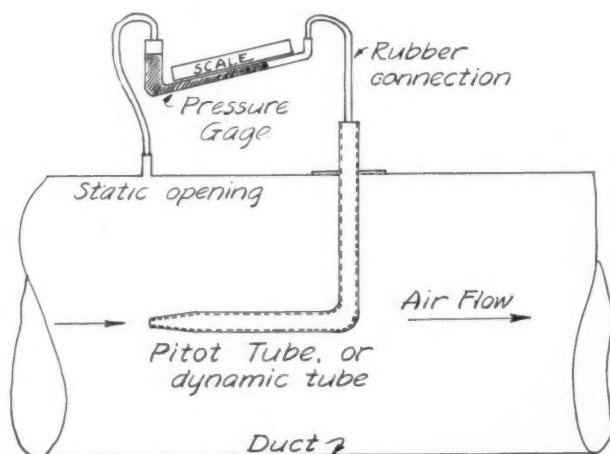


Fig. 2—Instrument used for measurements of velocity pressure in ducts.

that the velocity effect is converted over into a velocity pressure. The pitot tube is connected to the inclined manometer or pressure gage as shown in Fig. 2 and the velocity pressure is measured in terms of inches of water. Details of making velocity measurements with a pitot tube will be described later.

The Inclined Manometer

A simplified line diagram of an inclined manometer is shown in Fig. 3. A pressure head (regardless of whether the velocity head, static head, or total head is considered) of "1-inch water gage" refers to that

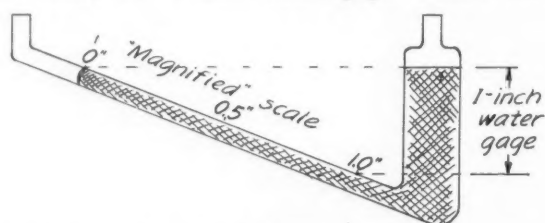


Fig. 3—Simplified line diagram of inclined manometer or pressure gage.

pressure which is capable of supporting a column of water one inch in height. Technical literature refers to that pressure as "1-inch w. g." which is an abbreviation for "1 inch water gage."

Where pressures of several inches on the water gage are to be measured, the ordinary U tube, such as that shown in Fig. 4 is used. It may be noted by comparing the tubes shown in Fig. 3 and Fig. 4 that although the actual difference in height or elevation is the same in both tubes, namely 1-inch, the actual movement of the liquid in the inclined tube is very much greater than the movement of the liquid in the vertical U tube. The inclined tube is a device which "magnifies" the vertical movement of the liquid, and the amount of magnifica-

tion is dependent entirely on the angle which the inclined tube makes with the horizontal plane.

In order to facilitate the process of making measurements to units of tenths of an inch and to hundredths of an inch, the inclined scale shown in Fig. 3 is subdivided into tenths and hundredths of an inch. A pressure of 0.1 inch w. g. would be represented in the

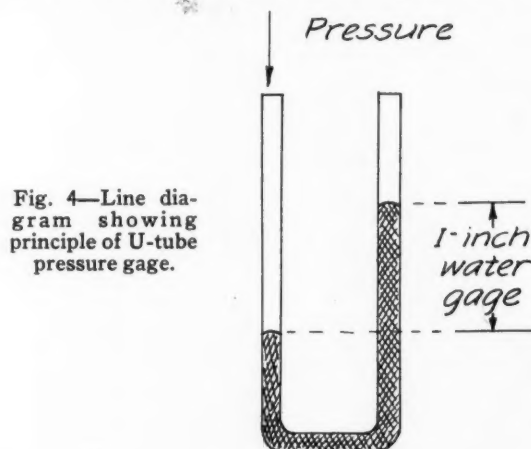


Fig. 4—Line diagram showing principle of U-tube pressure gage.

U tube shown in Fig. 4 by a vertical movement of exactly 0.1 inch (one tenth of an inch) but would be represented by a movement on the inclined tube shown in Fig. 3 of one-tenth the entire inclined scale. In the usual commercial instrument, 0.1 w. g. represents a movement of the liquid of approximately one inch.

Although the usual commercial instrument is marked in units of "inches of water," the actual fluid used in the liquid is seldom water, but usually kerosene or a similar light fluid. Since the density of kerosene is less than that of water, it will require a greater depth than one inch of kerosene to produce the pressure which is equivalent to one inch of water. The relationship is illustrated in Fig. 5. For instance,

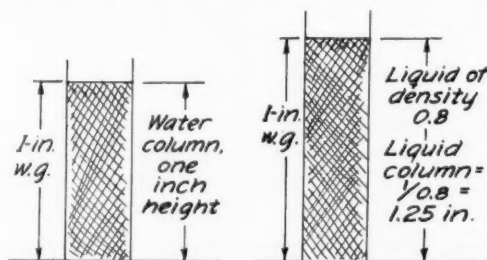


Fig. 5—One inch, water gage, represents a one-inch column when water is used, but represents a 1.25-inch column when a liquid of 0.8 density is used.

a liquid having a density only 0.8 that of water will require a liquid column equal to "1 divided by 0.8," or 1.25 inch, to produce the same pressure as one inch of water. Therefore, when such liquids of lighter density (of say 0.8) are used in the gages, such as those shown in Fig. 3 and Fig. 4, the vertical height of one inch is changed to 1.25 inch.

General Notes on Pressure Gages

The following items concern the use of gages such as those shown in Figs. 3 and 4.

- a. For air pressures encountered in ordinary ventilation work the liquid U tube or inclined tube is commonly used.

(Continued on page 52)

Insulation For House Construction *

By J. D. Hoffman

Professor of Practical Mechanics
Purdue University

[[Part 3]]

AS WE come down from the attic to the first floor level, we find a condition quite similar to the one explained in the June issue. In old houses the studs quite generally overlapped the joists, resting upon the plate (Fig. 7), and the spaces between the joists and studs were left open. To close these spaces, in houses already built, fill in between the

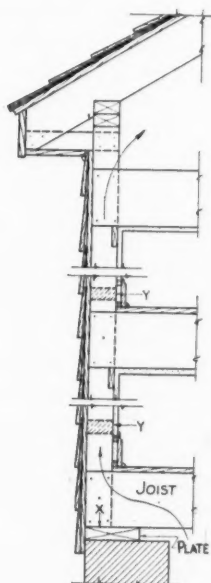


Fig. 7

Cross section of old style exterior wall showing studs overlapping joists resting on plates. Spaces left open between studs and joists offers paths for air and fire travel. Such houses may be cold and dangerous.

joists with closely fitting boards, as at B (Fig. 10). This can be done very easily by ripping strips of fiber boards just the width of the joist and cutting to length by a hand saw. These fiber boards are soft and may be cut slightly larger than the space, and then driven to place with a hammer, without nailing.

For new houses, a tight floor should be extended to the outside sheathing boards on all sides. This will

*Reprint of Extension Series No. 31, Engineering Extension Department, Purdue University.

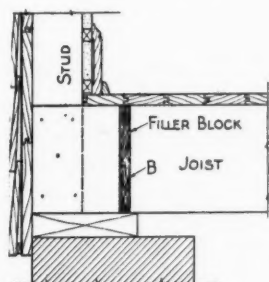


Fig. 10

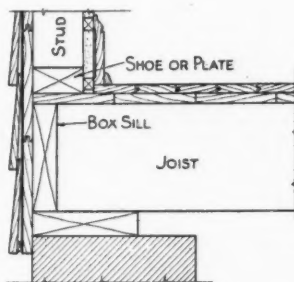


Fig. 11

Spaces between joists can be blocked off by installing a tight-fitting piece of wood or composition board. In Fig. 11 the newer type of floor construction shows flooring carried to outside wood.

cut off all connection with the basement. The studs would, therefore, rest upon a 2 x 4 plate or shoe spiked on the top of the floor instead of resting on the lower plate (see Fig. 11). If the studs could always be placed immediately above joists there would be no need of the 2 x 4 plate, but this is seldom the case. Other types of construction at this point may be used but the one mentioned is found to be very satisfactory.

All double floors should be laid with a good grade of building paper between the floors. This eliminates the passage of dust and reduces somewhat the transmission of heat and sound.

Fire stops have been mentioned as advisable in framed walls. These can be recommended for the same reason as mentioned for heat losses to the attic, i.e., to cut off air circulation. (See Fig. 12.) Fire frequently originates in the basement from overheated joists or floor boards above or near to the boiler or furnace. The flames will then follow between the joists to the side walls and up the side walls through the openings between the studs, if such passages are not firestopped. In this way the entire house may be in flames in an incredibly short time. In addition to firestopping, cutting off these stud spaces serves effectively to cut out mice, rats, and other vermin.



Fig. 12

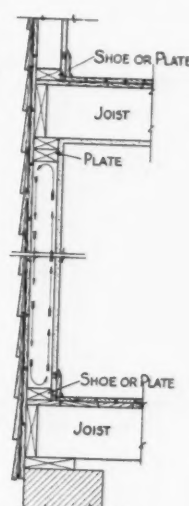


Fig. 13

These two drawings show open stud spaces from basement to floors above. A basement fire finds paths of travel through these spaces. The proper method for blocking off is shown.

Firestops are best put in at the floor and ceiling. Some are made continuous, as in the "Western" construction with a 2 x 4 plate above the joists and a double 2 x 4 plate below the joists, thus isolating the stud spaces for each floor. (See Fig. 13.) In this plan each floor is an independent unit.

Frequently firestops of 2 x 4 materials (stud ends that would otherwise be scrapped) are cut to length and nailed in between the studs somewhere between

(Continued on page 50)

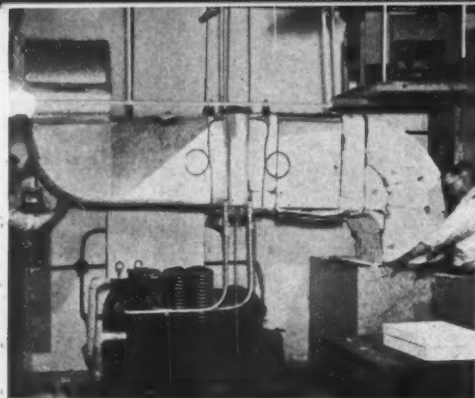


Fig. 1

The mechanics are here applying the insulation blanket to the ducts leading from the fan. The cooling coils and filters are located ahead of the inspection door. The exhaust fan for the space above the display lights is seen in the upper right corner.

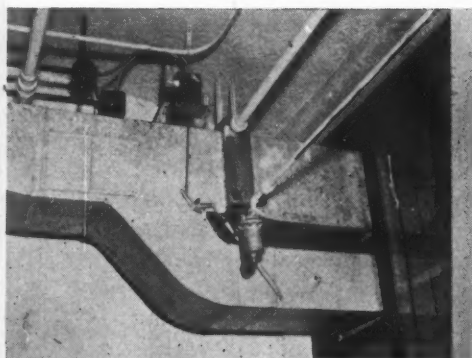


Fig. 2

The tempering coil in the outside air intake, showing the bypass and the modulating mixing damper with motor. The text explains the operation of this part of the system during winter and summer.



Fig. 3

Small drop lights hiding exhaust from display room into light space. Each booth has one of these concealed grilles.



Fig. 4

View along one side of small job display room showing buyers' booths. Air supply and exhaust are on the opposite wall. Less than $\frac{1}{4}$ degree temperature variation was found in this room.

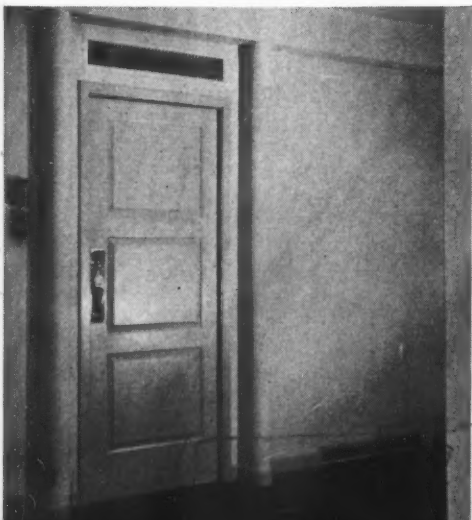


Fig. 5

The winter and the summer thermostat and the grilles. The grille above the door is supply, those in the baseboard are returns. Note that grilles add, rather than subtract, from appearance.

Air Conditioning Design For Dress Manufacturers Display Rooms

SOME peculiar problems were encountered in air conditioning two dress manufacturers' show rooms and offices in a downtown building in Chicago. The building—the Garment Center Building—is rented almost exclusively by manufacturers of women's ready-to-wear, who rent workroom, office and display space according to their particular method of operation. Some concerns have their entire establishment in the building—others manufacture elsewhere and concentrate their sales staff in the building.

The two recently completed installations are sufficiently alike in most particulars to make one discussion applicable to both jobs. In each instance the sections air conditioned consist of the show room and offices, differing only in size of apparatus required.

In both cases the spaces conditioned are surrounded by workshops or other offices so that there is little if any sun load to be considered. The systems are for twelve months' operation—heating and ventilating in winter and cooling in summer. Due to the peculiar conditions the winter operation really is a cooling proposition because of the fact that the workshop and offices surrounding the conditioned spaces were found to average 80 degrees in winter—much too high a temperature for buyers' comfort. (Figs. 4 and 6.)

Winter System Design

For winter operation the systems were designed for operation as follows. Because of the 80-degree surrounding air, complete recirculation was impossible so a duct was run from the blower to an outside wall and sized to introduce outside air to the fan of approximately 25 per cent of its capacity. As shown in the photographs, a tempering coil automatically operated and provided with a by-pass duct and damper was used for tempering. The coil is connected to the vapor heating system of the building and is sized large enough to heat zero degree outside air to 90 degrees when necessary. (Fig. 2 and 8.)

The outside air thus tempered is mixed at the blower with recirculated air and passed through filters and a second coil which is used for cooling. From the coil housing the air is conveyed by ducts to the rooms conditioned and introduced above the head level of occupants. While the main heating medium is direct radiation, very little heating is required due to the conditions previously mentioned. (Fig. 7.)

In both installations the blower, cooling coil and filters together with the compressor for cooling are located just outside the conditioned space in the work-

Fig. 6
Right—View of larger job display room with modernistic furnishings, lighting effects, etc. The exhaust grilles are behind venetian blinds at the far end of the room.



shops thereby permitting very short runs of duct. As shown in the photographs these runs from the cooling coils are heavily insulated to conserve all possible cooling effect. (Figs. 1 and 7.)

Winter Operation

The winter heating and ventilating operation is as follows. Seventy-five per cent of the air handled by the fans is recirculated. Air is withdrawn from the rooms through grilles in the baseboard and is introduced through register faces above doors, in mirrors, high up in side walls and behind venetian blinds depending on the effect desired by the owner. Twenty-five per cent of the air circulated is brought in from outside, heated by the coil near the intake, brought to the blower where outside and recirculated air is mixed, filtered and passed into the rooms. Both installations are figured to give seven air changes per hour in winter. Two thermostats are used. One is for winter heating; the other is for summer cooling. Both are adjustable within limits. Velocities at register faces are about 400 feet per minute. (Figs. 5, 9, 10.)

In one show room the air is blown across the narrow width of the room; in the other show room air is blown the long dimension of the room. Check tests showed that in the show room where air is passed across the narrow dimension temperature readings within $\frac{1}{4}$ of a degree were obtained from seven scattered stations. Both jobs have a manual damper which reduces the register velocity and air change at times where elderly buyers are present.

Cooling

In both show rooms the chief cooling load—both summer and winter—is from the large bank of lights behind the glass ceilings. This source of heat accounts for about two-thirds of the cooling load. Provision has been made in both installations for a separate exhaust system for this area above the ceiling. On the smaller installation, where there are booths along one wall, small drop fixtures have been placed in the ceiling of each booth. Air is pulled out of the display room through these fixtures; enters the space above the ceiling and is pulled into the exhaust fan. (Fig. 3.)

In the larger installation the exhaust air passes through return faces set behind venetian blinds, then through the light space and into the fan. In both installations the exhaust fan has a capacity approximately 10 per cent less than the supply fan so that a slight air pressure is maintained within the show room. This is to prevent entrance of odors from the workshops.

Summer Operation

Air circulation is speeded up to about double capacity for summer cooling. This is effected by in-

(Continued on page 49)

Fig. 7

Closeup of compressor, coil and filter housing and heavily insulated main ducts.

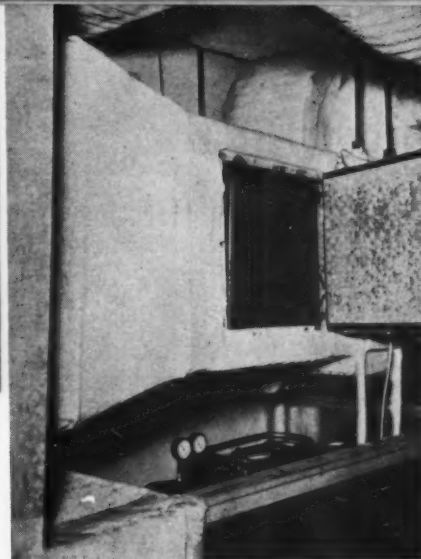


Fig. 8

The outside air intake on the larger job, showing the tempering coil, mixing damper, damper motor. The text explains the operating cycles.

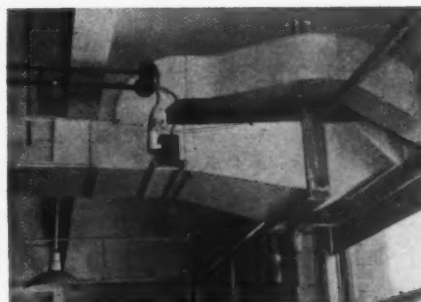


Fig. 9

The Junior display room, finished in wood, with the supply grille above the light trough. Return is through grilles in doors leading into models' room.



Fig. 10

Looking into a private office at the supply grille (upper) and return in the baseboard. In this installation the exhaust fan and the supply fan run constantly. The thermostat controls the compressor or the tempering coil.



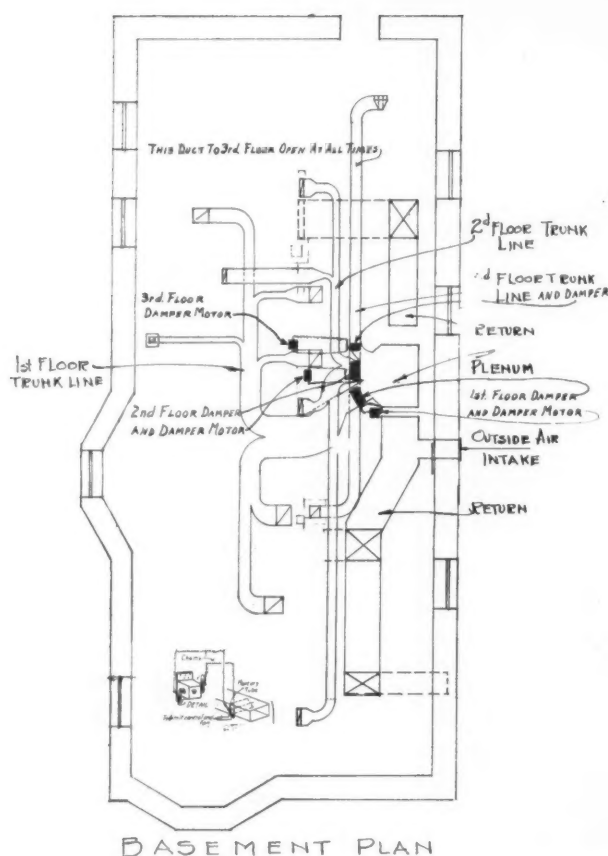


Diagram showing location of three zone dampers and motors and the Mercoid tubes used as a fan limit control.

WHEN these tests on a fan limit control and room thermostat operation were being run, additional tests were included to establish a satisfactory method of controlling the fire. The original system was hand-fired coal and as has been reported previously the boiler proved ample in capacity to maintain practically any desired steam pressure in the coils.

The first fire control consisted of a weighted bellows gauge located above the boiler and connected to the draft and check doors by means of chains run from the end of a long arm on which the weights were moved. The weights were adjusted to maintain a pressure of approximately 1 pound down to 3 inches of vacuum. In other words, when the pressure in the boiler dropped to 3 inches of vacuum the draft opened and the check closed. When the pressure reached 1 pound the draft closed and the check opened.

Under this plan of operation the boiler was under pressure at all times so that whether the fan ran constantly or ran intermittently there was always steam in the boiler and hence temperature in the coils to serve any thermostat requiring heat.

With the exception of one test period in which an oil burner was installed this means of fire control served all during the testing season. Plans called for the later installation of an electric damper motor which can be so connected as to maintain a constant steam pressure in the boiler or inter-wired with the zone thermostat so that the draft is closed whenever all thermostats are satisfied. It was planned to also try a hook-up in which the damper motor will open

Air Conditioning For Radiator Heated Houses

[[Automatic Control Part II]]

By Platte Overton

In the June issue we described some of the problems and tests of control for the American Artisan Test House installation. We pointed out some of the problems of limit control over the fire and high and low limit control of the fan. This article continues the discussion of control tests.

the draft whenever a thermostat calls for heat, but tests on this system have not been run.

During the period when automatic firing was tested, an oil burner was installed in the ash pit of the boiler. The operation of the oil burner was off of a pressure-stat which was adjustable from one pound of pressure to 16 ounces of vacuum. During the first part of the oil burner tests the boiler was maintained under constant pressure similar to the hand-fired coal operation. This meant that the oil burner had no electrical connection with the thermostat, but maintained a temperature in the heating coils at all times. The result of the test conducted on this firing system indicated that the oil burner ran in comparatively short cycles requiring only a few minutes to bring steam pressure up to the high setting of the limit control. During cold weather, when there was a constant demand for heat, the oil burner was idle and on during relatively short cycles.

Owner Control of Boiler

At the request of the building owner and also to satisfy the testing staff, this system of control was changed so that the operation of the oil burner was controlled from the thermostat on the second or owner's apartment. The plan was that whenever the second floor apartment called for heat the oil burner would start and continue in operation so long as the second floor thermostat remained unsatisfied. It was felt that the second floor thermostat would be typical of the operating cycles of both the first and the third floor thermostats.

The system proved satisfactory so long as the second-floor apartment was occupied in much the same manner as the first and third floor. However, during periods when the owner was away with the apartment locked up the heat loss of the second floor was not as rapid as that of the first and third with the result that the second floor thermostat remained satisfied when the first and third floor thermostats were calling for

heat. Due to the electrical connection the oil burner did not come on while the second floor thermostat was satisfied so the first and third floor thermostats called for heat during periods when no heat was supplied.

The testing staff feels that many owners of buildings with part of the building rented will be inclined to favor this particular type of control system since it gives the owner guidance over the operation of the automatic firing device. However, the staff feels that the same difficulty would be encountered as the staff found in the test house. Therefore, such a control system is to be approached with caution and the owner advised that this difficulty may be encountered.

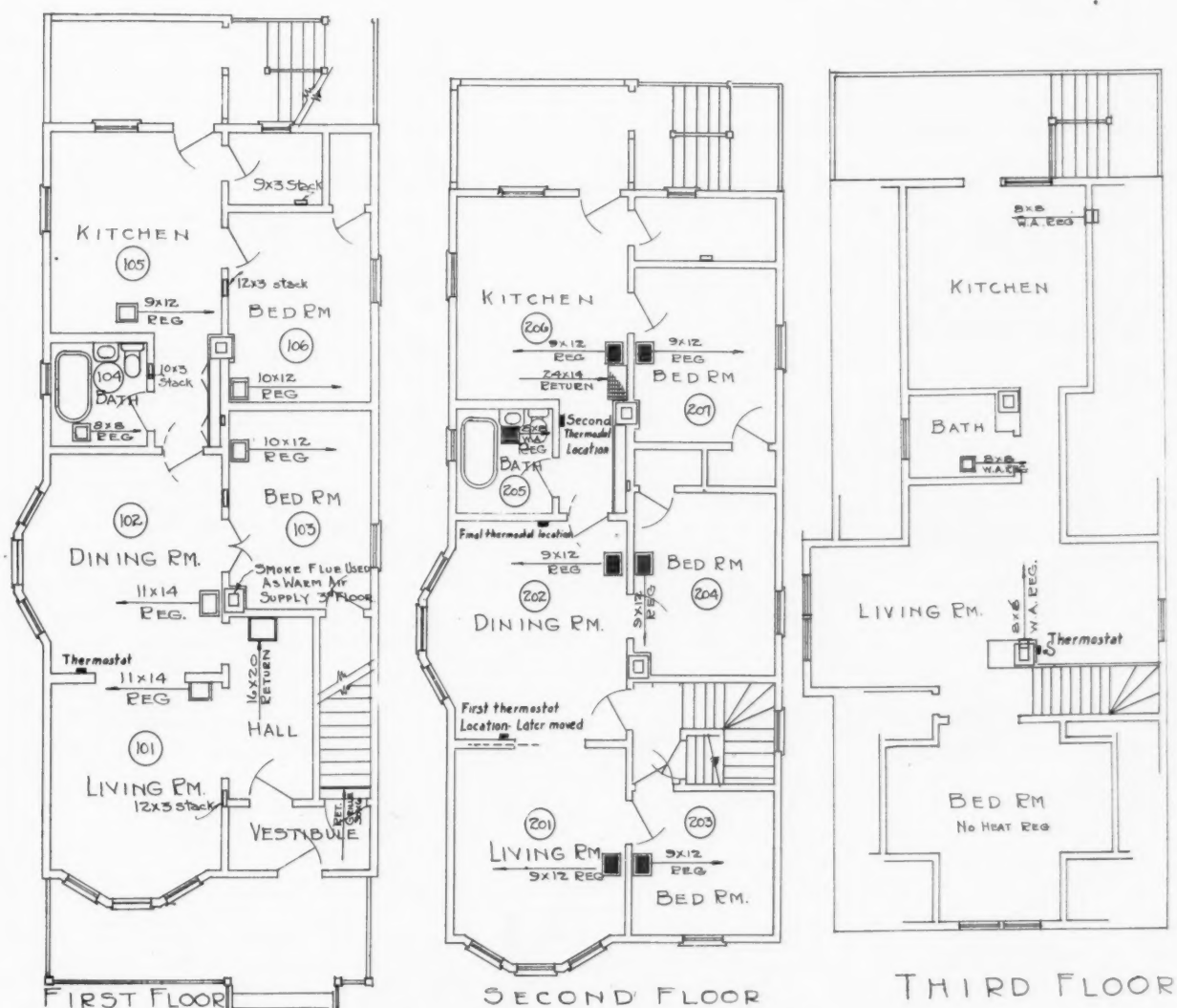
Future tests with an automatic firing device controlled by all three thermostats were planned but not conducted. Thus, when any thermostat calls for heat the oil burner, stoker or gas burner will come on to produce heat and when all thermostats are satisfied the automatic firing device will be idle. No test report is available at this time on the operation of this system.

Two general tests were conducted during the past heating season on the operation of the fan. As stated, the first test was devised on the basis of constant fan operation while the second test was intermittent fan operation.

In the test house, where each zone damper is controlled by an apartment thermostat and the fan was permitted to run constantly, only 10 per cent of the volume of air moved by the fan by-passed the zone dampers and was introduced into the apartments when the damper was closed. The exception to this statement is the rear part of the third floor apartment where, as stated, the duct is always open and hence carries its full volume of air when other zones are closed and the fan continues to run. While constant fan operation under these conditions might seem to be wasteful of electrical power, electric bills for the period when the fan ran constantly showed very little increase, if any, over the bills for periods during which the fan ran intermittently.

This would seem to indicate that on any zone control system where more than two zones are in use the constant opening of one or more of the zones permits operation of the fan at all times without materially increasing the power bill. This is particularly true, probably, during the cold weather when one zone or another is open practically all of the time. The constant operation of the fan considerably simplifies the electrical control system required and hence the contractor may feel warranted in recommending con-

(Continued on page 47)



Floor plans of the three Test House apartments showing locations of thermostats and registers.

Automatic Control For Cooling Systems

〔Water Cooling, Part 2〕

IF OUR fan runs all the time in a zone system we must connect our two thermostats—one on the first floor and the other on the second floor to duct dampers. When we cool the first floor we want all the air from the fan going into the first floor so our damper to the second floor is closed. Vice versa at night.

Our thermostat does not have to be connected into the fan circuit, but we can place a manual switch in the fan line to stop the fan during those hours when no cooling of any kind is required.

For the purpose of simplicity let us assume that we will pass all the air from the fan through the cooling coil or washer. Our chief control then is an electrical circuit whereby the room thermostat admits cold water to the coil or sprays whenever the room needs cooling down and shuts off water to the coil or sprays whenever the room is as cool as desired.

This brings us to the problem of the pump. If we have a well and the type of pump which has no storage tank, but is so large that the pump can maintain flow when water is being used, our thermostat can

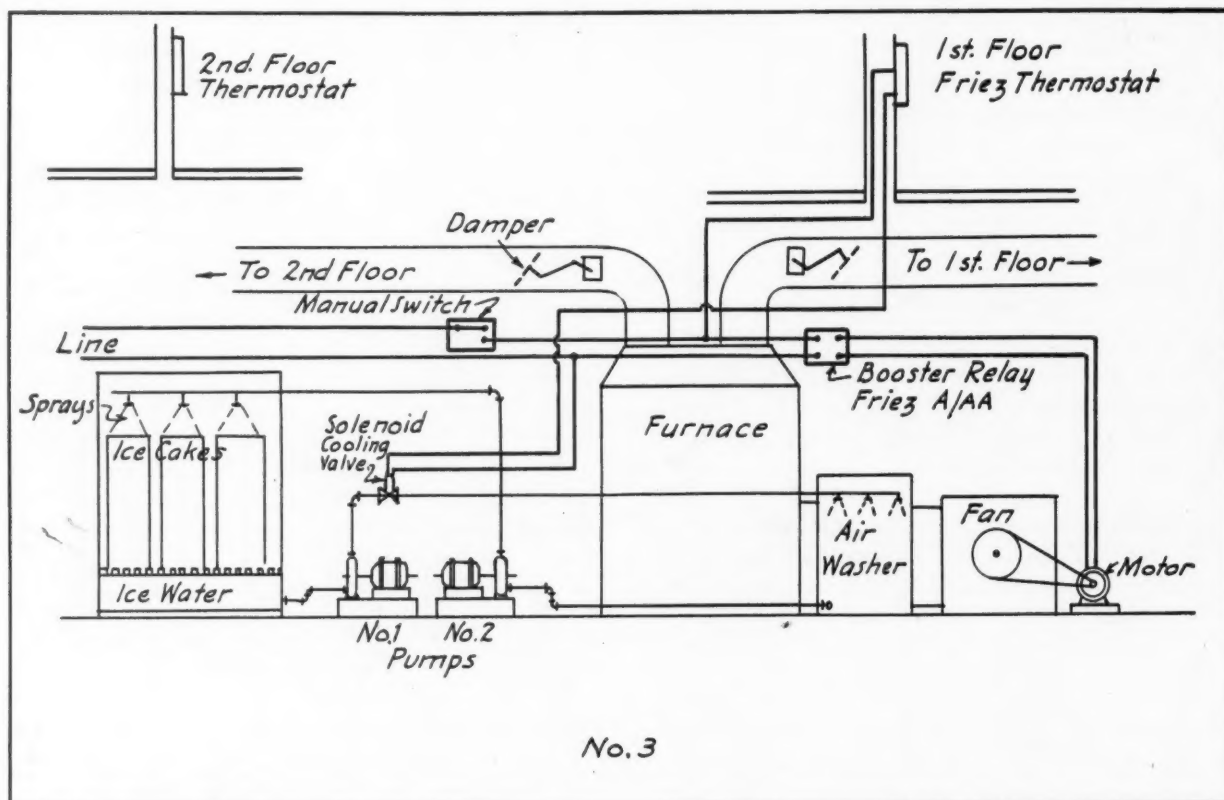
In the June issue we presented the principles of control for cooling systems using cold water. We outlined the two principle coolers—sprays and coils. In this issue we continue the discussion on cold water and give detailed suggestions for a system using water from a well and water from an ice chamber. We also show wiring diagrams for these systems.

start this pump whenever we want to cool. The trouble is that generally the same well and the same pump also furnish water to all the house faucets and the faucets may be open when the pump is idle.

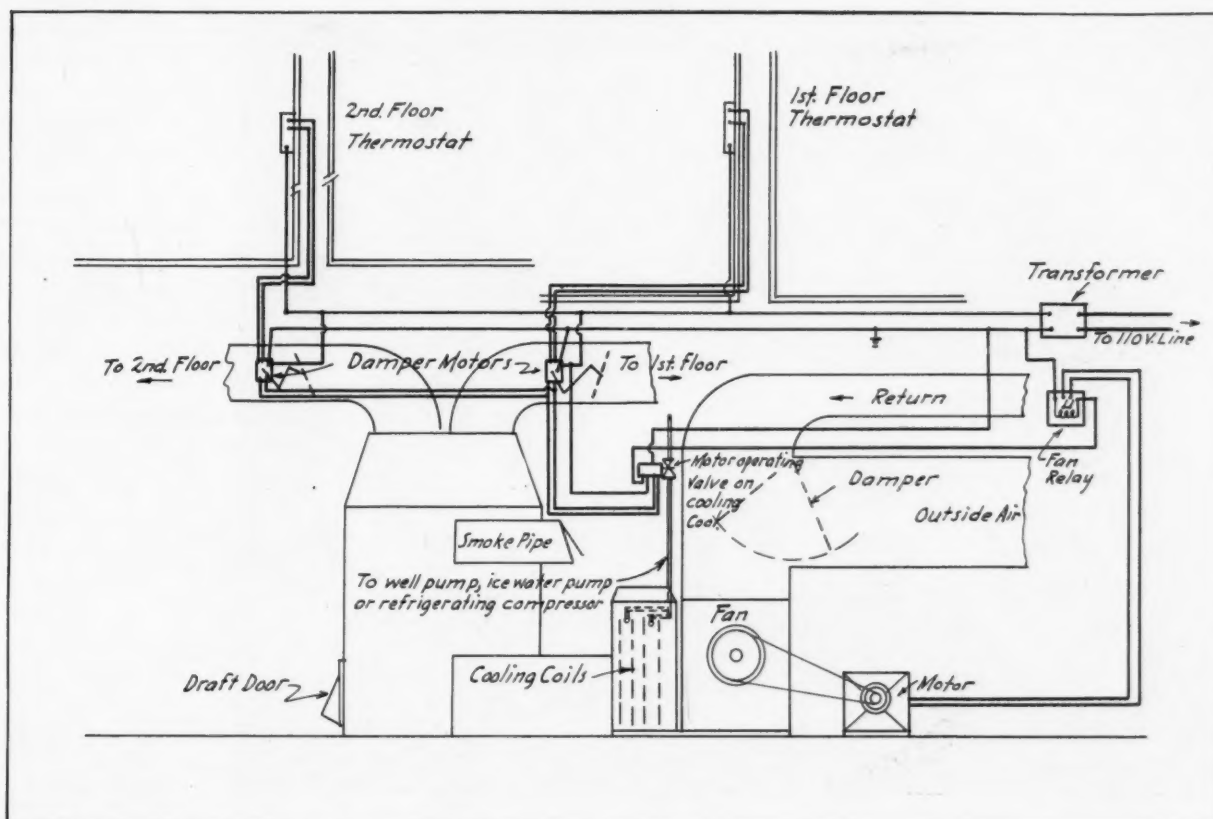
The contractor should recommend in such cases that the system be changed and a storage tank be installed. The well pump then maintains a range of pressure within the tank and whether faucets or cooling coil are using water there will be pressure. With this system our thermostat does not control the well pump, but controls a water valve which admits water to the coil or sprays whenever the thermostat calls for cooling and shuts off the water when the thermostat is satisfied.

This is all there is to a well system. We need only a piece or two of apparatus and we accomplish

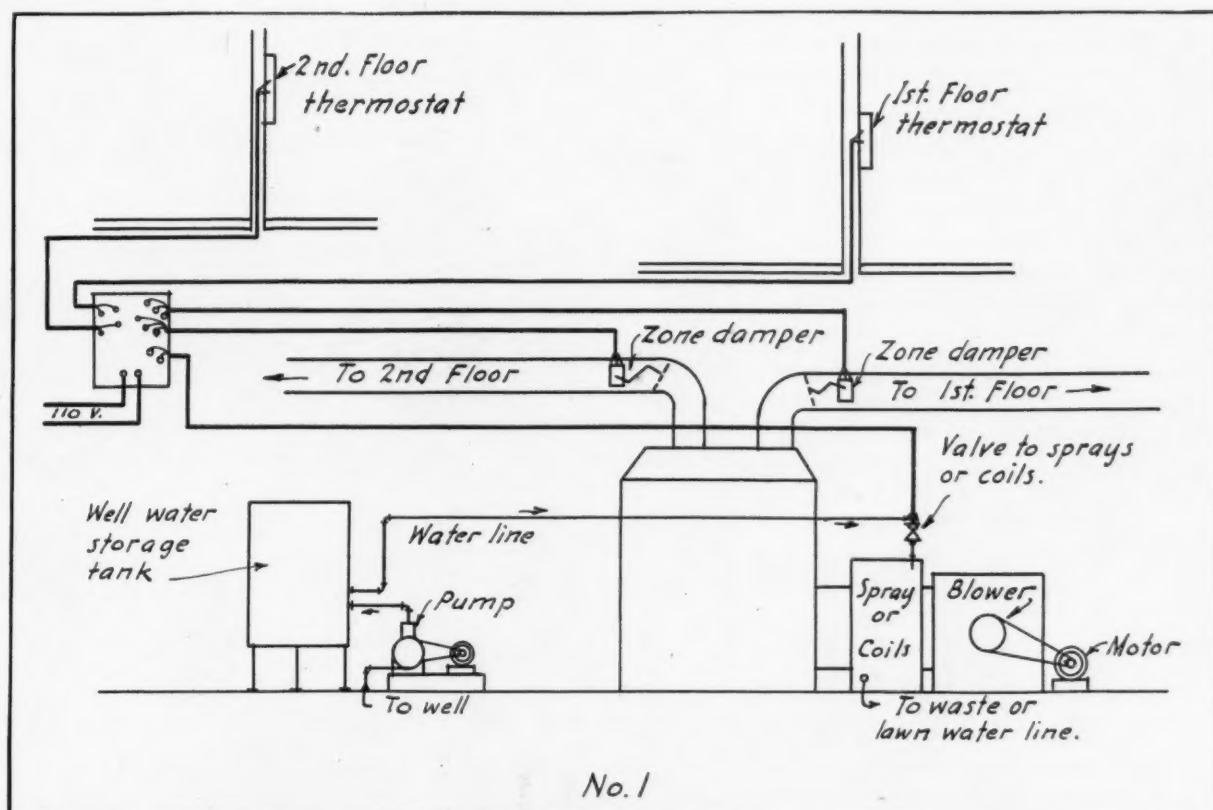
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The wiring diagram above for a spray system cooling installation with two water pumps shows instruments of Julien P. Friez & Sons, Inc., so arranged that the entire system is "off" when the switch is off. When switch is closed the fan runs continuously. With fan running when thermostat calls for cooling the solenoid valve admits ice water to the sprays. The booster relay relieves the thermostat of the fan motor voltage.



In this diagram the thermostats control respective damper motors. When either or both dampers open the valve to the cooling coil opens and the fan starts, and both function so long as one thermostat remains unsatisfied. The entire system shuts down when thermostats are satisfied. Instruments by Barber-Coleman Co.



Cook Electric Co. brings all wiring to a central panel board. Each thermostat controls the damper to its zone. Whenever any zone damper opens the solenoid valve to the coil also opens. At the same time the circuit to the fan motor is closed thus starting the fan. When all thermostats are satisfied the entire system shuts down.



Lockhart makes the most of special holidays by dressing his display window for the occasion. This window was arranged for Washington's birthday. The oil burner was placed in the center and a placard lettered in Colonial script faced the picture. Below is a typical Lockhart heated home

Lockhart's Oil Burner Sales Plans

ONE of the outstanding oil burner dealers in the State of Connecticut is the Lockhart Heating Co. of Norwalk, which, in addition to selling oil burners is a prominent warm air furnace dealer and sheet metal contractor. "Joe" Lockhart, proprietor, long had enjoyed an enviable reputation as a quality sheet metal contractor before he adopted furnace and burner selling, "just to keep up with the times," as he says. Now the latter provide the bulk of the profit earned.

Unlike the shops of some sheet metal contractors, the Lockhart store was always attractive and well ordered. When Mr. Lockhart converted the display floor into a show-room for furnaces and oil burners

little had to be done other than to place the specimen heaters and burners on the floor. This was done some five years ago and the demonstration units include three Richardson & Boynton heaters and an equal number of new Delco burners. It was at this time, also, that George Foote became a partner in the business, his intention being to specialize in heating solely.

Prospects for burners were not long in coming. Being a member of the leading local Country Club, the Chamber of Commerce and other social and civic organizations, Mr. Lockhart aroused interest in his appliances the minute he let folk know that oil burners had become a part of his business. He sold a burner during the first week of his merchandising campaign.



A typical Lockhart customer's home.

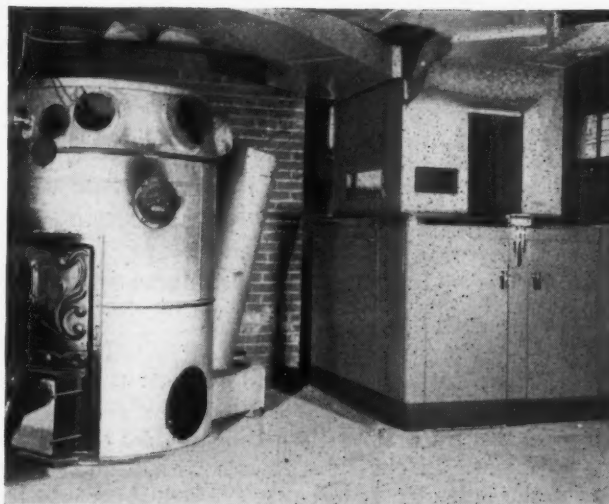
Every week since from one to a half-dozen burners have been installed and orders keep coming in from friends and neighbors of satisfied customers.

Although the friends and acquaintances of Messrs. Lockhart and Foote can be counted on to provide an active prospect list, novel methods have been employed to make sales and have attracted wide attention in Norwalk, Darien and New Canaan, towns also covered in the dealer's territory. For one thing, Lockhart is a firm believer in the business-getting power of fairs and exhibitions of varied kinds. During a recent Chamber of Commerce business "show" not alone did the Lockhart Heating Co. have a booth, but a representative stood at the entrance of the exhibition building giving out numbered tickets to visitors.

Lucky Ticket Drawings

The holder of the lucky ticket was given an oil burner on the last day of the show, a drawing being made from a hat in the Lockhart display booth. Preliminary to the gift the merits of the burner were emphasized and sufficient attention and interest in the product generated to bring several subsequent sales.

'Round about Norwalk residents call Mr. Lockhart "Major Joe," he being one of the few bona fide majors in Connecticut. This fact has earned for him considerable social prominence, with the result that when it comes to auction bridge or other social affairs "Major Joe" always is invited. Capitalizing



The Lockhart company also sells and installs oil-burning furnaces. This installation replaced an obsolete gravity system in a home where the owner wanted conditioned air even though his old furnace was still in good condition.

on this, the Lockhart Heating Co. had some bridge instruction and score cards printed, one leaf of which stressed the advantages of owning an oil burner. These have been handed out and mailed to more than 2,000 appliance prospects.

The Ash Can Tag

But of all the novel methods employed by this sheet metal and heating dealer perhaps none is more original than what might be called its "ash can" campaign. Under this plan all of the six salesmen of the contractor-dealer carry tags resembling shipping tags in shape and size. They are, moreover, attractively printed. As the men drive along in the regular course of their prospect calls they attach one of the tags to any and all ash cans seen at curbstones and in front yards.

The Lockhart message found on the cards and read by the owners of the ash cans is: "This tag, when presented at the store of the Lockhart Heating Co., Blank Street, is redeemable as a \$10.00 deposit on an oil burner. Why not let us install an improved oil burner and get rid of ash handling forever?"

(Continued on page 46)



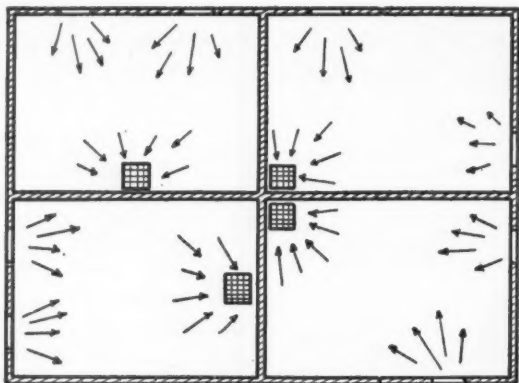
Installing of oil burners in warm air furnaces has been carefully worked out by the Lockhart company and its service crew. No detail, no matter how trivial, is left to chance. This mechanic is looking at the burner flame, balancing air supply so as to get the most efficient operation for this particular system.

What Is This Night Air Cooling?

[Part 2]

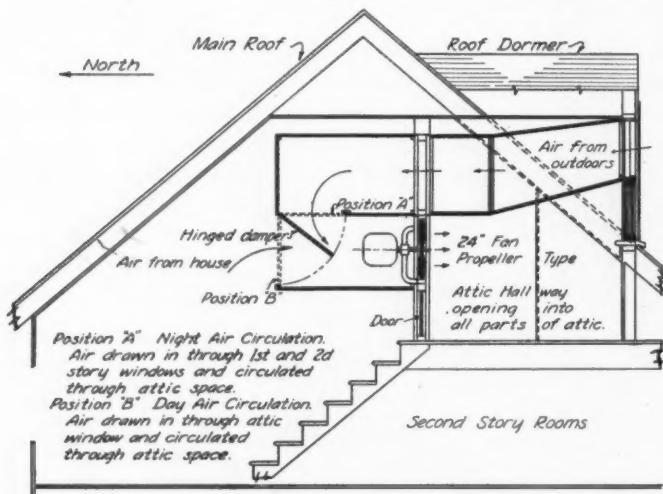
In the June issue we explained the basic principles of night air cooling—incorrectly called attic ventilation. These principles are simple in the extreme—the problems arise in deciding just how to lay out the system. In this issue we take up location of ceiling grilles, placing the fan, sizing the registers, determining their number.

THE third problem is getting the air out of the rooms. In one-story houses with a large attic, the best plan is to cut ceiling openings into the attic. These openings should be placed as far as possible from the windows. This means an inside corner or wall. The fan can pull from the open attic or we can connect our registers to the fan by ducts. More about this later.



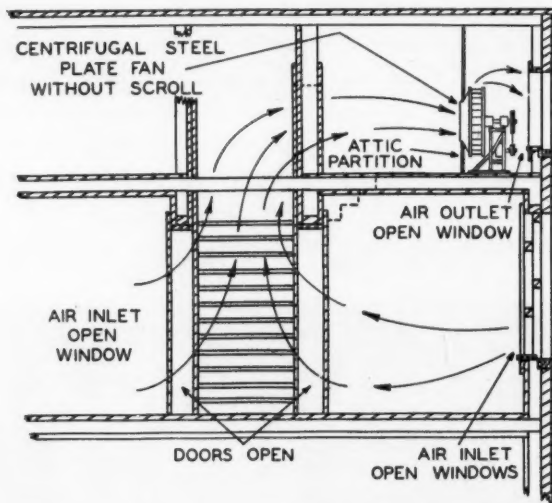
When ceiling registers are used they should be placed as far away from windows as possible in order to sweep the ceiling air out of the rooms.

In one-story houses with a very restricted attic, we should again use inside corner ceiling openings and let the fan pull from the attic space without any ducts.



In the Research Residence the fan was mounted in a door at the head of the attic stairs. Not all houses can be so equipped. A damper was provided so that the attic air might be circulated during the daytime and the attic shut off from the fan at night.

In two-story houses with a large attic and an attic stairs we should test to see if the attic stair affords an easy path for the air. Usually this means a centrally located stair. If the stair is in one corner, it probably will not serve satisfactorily. We can mount our attic fan in a door or partition at the head of the attic stair and let the pressure set up by the fan in the attic cause the air pulled up find its way out or



Where a stair door is impracticable the same result can be secured by placing the fan in a little room. Downstairs and attic air are pulled into the fan room where a pressure is built up thus forcing the air outdoors.

we can set the fan at an outside window and create a suction in the attic as well as in the house. This means that all openings through which air can enter the attic from outdoors must be tightly closed or the air will short circuit through the attic.

In a two-story house without any attic stairs, we again use inside corner ceiling openings and again we may connect the openings to the fan by ducts or let the fan pull the attic air out along with the air from downstairs.

In a two-story house with restricted attic and no stairs we can use inside corner ceiling openings and for economy, eliminate ducts.

In two-story houses we depend on the air brought in through first floor windows finding its way up the main stairs. Some houses will not lend themselves readily to this operation so we must decide whether to chance this air movement or install openings in first floor rooms. If we choose openings they should be up close to the ceiling to remove the hot ceiling

stratum of air. Baseboard and floor openings do not work.

Wherever ceiling openings are used they must be selected for size. This means we must consider velocity of air through the opening. One of the most helpful bits of information to appear lately was the chart and explanation by S. Konzo in the May American Artisan showing results obtained with various grille velocities. This chart was originally prepared by J. M. Dallavalle and shows that velocities measured at the grille face ranging from 1,000 down to 100 feet per minute all result in a uniform velocity of about 50 feet per minute 18 inches away from the register. This means that whether we use 1,000 feet per

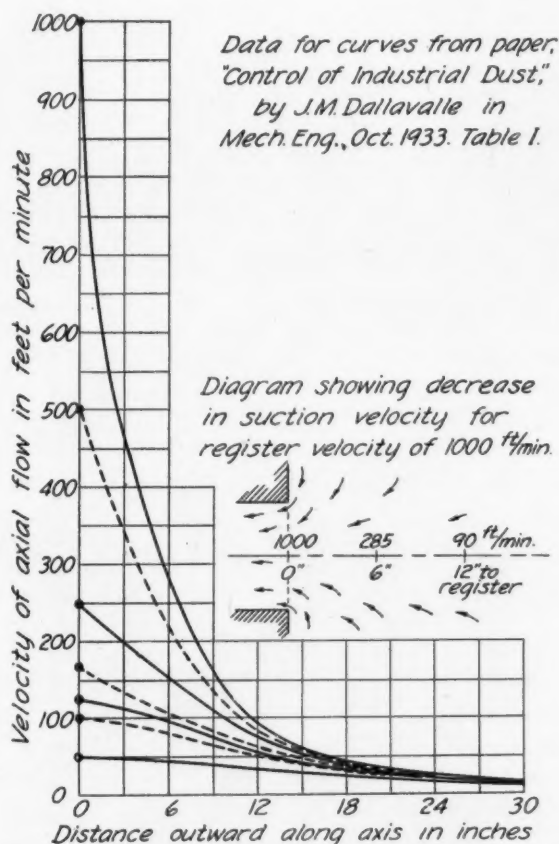


Diagram showing reduction in suction velocity at increasing distances from a return air grille.

minute or 100 feet per minute measured at the grille face, the velocity of air traveling toward the grille at 18 inches away from the face are both about 100 feet per minute.

The other side to this picture is that velocities at the face of 1,000 feet per minute will likely result in a resistance on the fan of about .21 inches as compared with a resistance of .015 for 250 feet per minute velocity. Since we want to keep the total frictional resistance on the fan as low as possible there seems little benefit in using high velocities and small grilles except for a matter of a few cents in cost of the grille.

The tendency in the industry now is to use grille velocities of from 500 to 700 feet per minute in calculating the size of the grille required for each room. An excellent form of table based upon fan capacities

(Continued on page 51)

Back of That Furnace --

*There's
MONEY
for You*



ONLY a small percentage of the warm air furnaces in your neighborhood are efficiently equipped with air filtering and circulating units. This means money to you! Every owner of a furnace not equipped with an AIR-PAK should be a live and interested prospect, for AIR-PAK will heat the home cheaper and distribute heat more evenly and better.

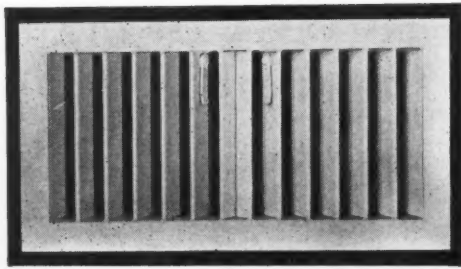
Somebody is going to get this business! Why not you? If you have not yet learned of the advantages and profits in installing AIR-PAKS—a year round business—don't delay another day, write for details and prices.



1935 W. 114th Street
CLEVELAND, OHIO
MAKERS OF

AIR-PAK

Adjustable CONTROL over Air Direction and Volume



with the new, exclusive-featured

WATERLOO *Air Conditioning* REGISTERS

Adjustable Air Direction Control

90-degree adjustable control—1, 2, 3 or 4 ways, as ordered. Quick, easy adjustments—louvers turn easily as a unit—no troublesome individual adjustment needed. Positive lock sets louvers securely in position at desired degree of angle.

Tested Capacities

Old time paper-and-pencil computation has been replaced with actual blower tests in determining the precise capacity of Waterloo Air Conditioning Registers at various velocities. These scientific tests eliminate guesswork. We furnish Toenjes-Waterloo Size-O-Graph Performance Charts—a practical, scientific means of selecting the proper size register for any particular job.

PLUS--

Slanted louvers that provide attractive "Venetian Blind" effect, harmonizing with modern home decoration—duct-concealing.

No other registers on the market offer such beauty, style and exclusive, TESTED mechanical advances. Specify Waterloo.

Send for New Catalog

New designs, new charts and installation data, profusely illustrated. Tear out this signature and write for your copy today.

The Waterloo Register Company

Floor Registers, Floor Cold Air Faces, Base-board Gravity Registers, Wall Registers, Steel Grilles, Wood Faces and all furnace supplies.

Waterloo, Iowa — Seattle, Wash.

In New York—Air Conditioning Utilities, Inc.
489 Fifth Ave.

In Los Angeles—California-Waterloo Register Co.
824 Clanton St.

Lockhart's Sales Plans

(Continued from page 43)

In the distribution of these tags there is no effort to restrict the offer. There is not, for instance, an ash can week, or an ash can special neighborhood for different weeks. Lockhart's men sometimes go around looking for cans on which to attach the tags. If they could place them on 1,000 per day instead of the 10 per day which they do Messrs. Lockhart and Foote would like it so much the better. For this plan has pulled orders more effectively than any other tried.



Another house heated by Lockhart. This house, by the way, is a House Beautiful prize house publicised nationally by the magazine and visited by hundreds of home owners or buyers

Holders of ash-can tags do not always come to the store and redeem their tags, but they come to the store to see the burner anyway. The tag has excited their curiosity and often they come to see what they miss by not placing an immediate order. In a large number of instances the orders come later.

Still a Furnace Man

There is no stronger booster for warm air heating than "Major Joe" Lockhart. He would rather sell a furnace than beat par on the golf links. And this is going some because cowpasture-pool is a particular hobby. Not alone does he boost furnaces, but he sells almost 200 per year. Now that air filters, washers, conditioning, automatic control and blower-driven circulation have come as improvements Lockhart's enthusiasm has been brought to a point where more attention is devoted by the firm to heating than to general sheet metal work. An air conditioning warm air plant is referred to by Mr. Lockhart as the perfect system.

Besides the special advertising already described all the more ordinary forms likewise are used. This means daily newspapers, school programs, billboards, form letters, blotters and calendars. Almost no form of advertising is missed.

How Prospects Are Handled

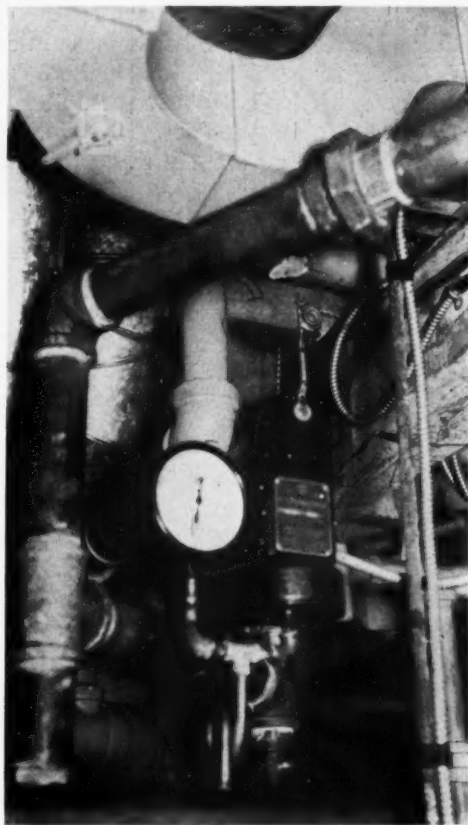
Attractive as are the display models found at Mr. Lockhart's, prospects are taken as well to the homes and other buildings of pleased customers to see burners in operation under conditions closely resembling theirs. That is, if the prospect is a store owner he is taken to an oil heated store; if he or she is a home owner he is taken to a home, and so on.

Test House Controls

(Continued from page 39)

stant operation where multi-zone systems are used.

Some ingenuity was required to cause the fan to operate intermittently. There were no fan switches on the zone damper motor so it was necessary to install small Mercoid tubes on the arms of the dampers. These Mercoid tubes were wired into the fan-thermostat circuit so that whenever a thermostat called for heat the zone damper opened. This tipped the contact in the mercury tube and started the fan. When all zones were satisfied and all mercury tubes were thus broken in their contacts the fan remained idle. While this particular system is not to be recommended over a damper motor with a fan switch integral in the instrument it can be used where such



The zone damper motors were located remotely from the dampers. Connection was by means of chains. This picture shows a damper motor and the chains.

devices are required. The operation has proved entirely satisfactory and the contact to close the fan circuit has been positive under all conditions.

Some interesting problems in connection with the location of thermostats quickly developed in the test house. On the second floor, the thermostat was originally installed along a dining room-living room wall which also houses a set of large sliding doors. Test thermostats located throughout the apartment indicated satisfactory room temperatures when the thermostat for the zone damper indicated a too-cold condition.

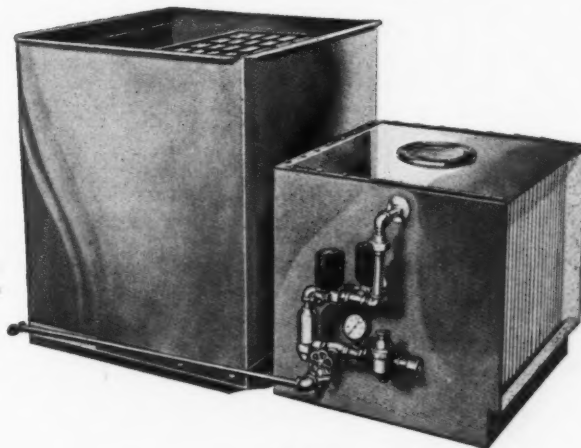
Investigation disclosed that the space occupied by the sliding door was practically open to the outside

Wash Filter Humidify

WITH THE COMPACT
Bishop & Babcock
AIR CONDITIONING
UNIT

This new complete Compact Assembly offers a unit ready for immediate use with the minimum requirement of installation work. It is furnished complete with fan, filters, motor and drive; all factory adjusted and requiring only a connection to the furnace and to the cold air return.

Write Today for Complete Information



THE
BISHOP & BABCOCK
SALES CO.

CLEVELAND

OHIO

Acres of Diamonds

¶ Everybody has heard the story of the Arab who roamed the world over only to find, finally, acres of diamonds in his own back yard.

¶ Furnace men may look enviously at other lines of business; but in warm air heating there are more opportunities than in any other business today.

¶ What business has had the benefit of such publicity as has been given air conditioning the past five years? And what a market has been built by it for air conditioning systems and devices! Dealers in time with the times are cashing in on this market.

¶ If your neighborhood is typical, 40 per cent of all the homes are furnace heated. And most of them have been pretty well educated in air conditioning. What a chance to sell Moncrief Blower-Filter Units, Miles Junior Air Conditioners and Moncrief Automatic Humidifiers.

¶ Here is a situation you can dominate, depending only on two things:

1. Your own enthusiasm for air conditioning.
2. Your energy in telling the air conditioning story.

¶ The Moncrief line of furnaces and air conditioning systems and devices—quality made, fairly priced—gives you everything you need to supply the needs of every warm air heated home.

¶ Send for literature and prices on Moncrief Furnaces, cast or steel . . . Moncrief Air Conditioning Systems for gas, coal or oil . . . Moncrief Air Conditioning Devices . . . Moncrief Pipe Fittings and Accessories!

THE HENRY FURNACE & FOUNDRY CO.

3473 East 49th Street Cleveland, Ohio

air, as this door space was not insulated and did not even have lath and plaster. The temperature of the air in the sliding door space was, therefore, considerably lower than the temperature of air in the room and it was necessary to move the thermostat.

On the third floor, as shown by the floor plan, one large register located in the old smoke flue is used to heat the living room and a front bedroom. The thermostat is located directly above the stairs to the third floor so that there is either a rising column of warm air up the stairs or a descending column of cold air down the stairs—generally cold air going down the stairs. While it was not found necessary to change the location of the thermostat it was necessary to operate the thermostat at a somewhat higher temperature than was indicated by thermometers placed in other parts of the apartment. This increased temperature for thermostatic operation is about 3 to 4 degrees resulting in a thermostat setting of 74 to 75 degrees.

It was hoped that tests could be conducted this past year to indicate what advantage, if any, there is in intermittent control of the boiler as compared to maintaining a constant boiler pressure. However, due to the press of other testing matters this particular test was not run. So far as can be judged from observing the operation of the boiler the maintaining of a constant pressure did not result in any unnecessary fuel consumption. Under the average winter weather conditions the boiler draft door opened and closed on moderate cycles and little over-run of pressure was encountered. The chief benefit of this type of boiler operation lies in the fact that whenever a thermostat calls for heat, heat is available.

Heat Lag

With hand-fired coal there is some question as to how long a period of lag will be encountered where the thermostat also opens the boiler draft door. In a house of the type of the test house where heat loss is rapid during cold, windy weather a prolonged period of lag might result in unsatisfactory temperature conditions in various parts of the house. It was observed during the winter season that the operation by means of constant pressure maintenance resulted in very satisfactory cycles of pressure. In other words, the draft door opened and the pressure went up, the draft door closed and the pressure went down, in comparatively even cycles never resulting in producing too much steam or permitting the boiler to get so cold that a long period of lag was encountered.

The chief difficulty with this type of operation would undoubtedly be encountered in the spring or fall when weather conditions are considerably milder. During such a season it is admitted that the boiler would probably produce some little heat not actually required, but because there is no air flow through the coil when the fan is idle it requires only a very few minutes to bring pressure up and, therefore, close the draft door. During periods when the fan is idle practically all of the steam developed is maintained within the boiler and the very short length of pipe and coil so that the heat loss is very low. Therefore it is felt that this type of operation is not unduly expensive from the standpoint of fuel consumption.

Air Conditioning Dress Display Rooms*(Continued from page 37)*

creasing the blower speed to produce between 13 and 14 air changes per hour. In the smaller installation all air handled by the supply fan in cooling is based upon 255 c.f.m. total outside air as against 170 c.f.m. outside air in winter. In the larger job the summer supply is 375 c.f.m.

In the larger installation the supply fan runs all the time in summer. This maintains a constant air change and ventilation. The compressor operates intermittently at the command of the summer thermostat, coming on whenever temperatures exceed 78 degrees. The maximum cooling differential is 15 degrees—in other words 80 degrees on a 95 degree day. The exhaust fan is started and stopped by a manual switch.

In the smaller installation the exhaust fan is operated intermittently. The girl in charge of the show room keeps the lights off when the room is empty. Upon arrival of buyers she pushes on the light switch which automatically starts the exhaust with the compressor coming on whenever temperatures go above 78 degrees. The supply fan runs all the time for circulation and pressure maintenance.

Control Systems

For operation during the heating cycle, that is—during the winter months—the heating coil is equipped with a face and by-pass damper. (Fig. 2.) The dampers are so arranged that as the face damper opens the by-pass damper closes and vice versa. This set of dampers, that is—the face and by-pass dampers, are automatically operated by Minneapolis-Honeywell modulating damper motor. This damper motor is capable of placing the dampers in an infinite number of positions. That is, placing them in such a position that the air delivered into the room will be exactly the right temperature. This damper motor is controlled from a room thermostat of modulating type and as a safety device a modulating low limit type of ductstat is placed in the delivered air chamber. This ductstat is set for 60 degrees and operates to prevent the dampers ever assuming a position during the heating cycle so that air is never delivered into the room below 60 degrees, thus preventing the possibility of cold drafts.

During the summer cycle there is a second room thermostat (Fig. 5), which operates to start and stop the refrigeration compressor, thus maintaining proper room temperatures. (Figs. 1 and 7.) In addition to starting and stopping the compressor this room thermostat also functions to close the outside air damper when the compressor shuts off, thus preventing blasting hot outside air into the space to be conditioned while the compressor is off. This feature of closing the outside air damper when the compressor is off is a more or less novel feature and is a very important one where a large percentage of outside air is used on hot days because there might be a tendency to blow cold air at about 60-70 degrees into the room while the compressor is operating and then when the compressor is off, delivering hot outside air into the room at 85 degrees, or warmer, thus giving a blasting effect.

This installation is also arranged so that whenever the fan motor is shut off the outside air damper closes.

JOBS LIKE THIS...**..ARE PROFITABLE**

be sure of your share
— specify

TRANE COILS

The above is typical of the many TRANE jobs installed by Air Conditioning contractors throughout the United States. By specifying TRANE coils you accomplish two purposes—first, you are positive that the information on capacities and ratings is correct; and second, you know that the Coils will stand up on the job.

Don't take chances with inferior heating or cooling coils. TRANE Light-Weight Heat Transfer Surface is recognized as standard by many of the leading architects, engineers, owners and contractors. And remember, there is a proper TRANE Coil for every Air Conditioning application, regardless of the type system used.

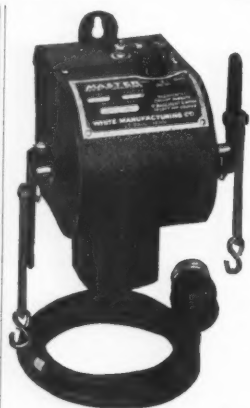
HEATING**COOLING****DIRECT EXPANSION — WATER**

The most complete and accurate information regarding Coils and their uses is available to you if you will write Cooling Dept. A, The Trane Company and give us information as to your application. Write us today.

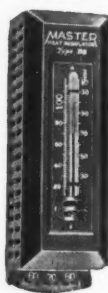
THE TRANE COMPANY
LA CROSSE, - - WISCONSIN

Type B-22

Two-Position

**MASTER
HEAT REGULATOR****Only
\$13.50
to dealer**

Here's something to offer the modest home owner. A genuine Master Regulator priced within his reach, and as reliable as the regulators in the homes of the wealthy. Responsive to changes of 1 degree. Noiseless and accurate. It will outlast the heating plant and do a good job of advertising for you as the years pass. Listed as standard by Underwriters Laboratories.



Made by the manufacturers of the famous Type B-144, the Original Gradual Control Heat Regulator.

WHITE MANUFACTURING CO.

2362 UNIVERSITY AVENUE

ST. PAUL, MINN.

**HESS FURNACE
AIR CONDITIONER
BLOWER FILTER UNIT****NEW NO. 10 HESS AIR CONDITIONER**

Cabinet style, rounded corners, green and black crinkle enamel finish, for use with any furnace, circulates approx. 1000 C.F.M. thru average furnace system. Air is filtered and passed thru water action for proper humidity in heating season. No sprays or solenoid valves used. Priced low to reach the largest, small home, market.

HESS NO. 1—NO. 2—CONDITIONERS

Capacities up to 2000 C.F.M.

HESS BLOWER FILTER UNITS—NO. 1—NO. 2

Capacities up to 2500 C.F.M. Our prices offer exceptional values and Saleability.

HESS AND BENEFACOR FURNACES

Are rectangular, welded steel, brick lined. In a wide range of sizes and prices, with numerous exclusive features of quality and outstanding performance.

HESS EQUIPMENT

IS distinctively different and Hess dealers can beat ordinary competition.

WRITE FOR DEALER PORTFOLIO**HESS WARMING & VENTILATING CO.**

1211-27 S. WESTERN AVE., Founded 1873

CHICAGO, ILLINOIS

House Insulation*(Continued from page 35)*

the first and second floor levels and between the second and attic floor levels, say at Y and Y. (Fig. 7.) Firestops at intermediate levels in the walls are not as satisfactory from the standpoint of insulation as those placed at the floors, but these will not preclude flexible fibrous insulations such as Cabot's Quilt, etc. Such stops need not be put in if the spaces are to be filled with loose non-combustible, fibrous insulation in bulk, such as rock wool, mineral wool, and the like, as mentioned later.

Workmanship is an item of vital importance in this type of wall. The best of materials may be used according to the most approved plan, but if the work is carelessly done the insulating qualities will be very poor. This is especially true around the window frames, where the plaster finish is never tight with the frame and where the inleakage around the finish casing and apron below the window is frequently too great to be neglected. This leakage is reduced to a minimum where fiber board is used instead of laths as a plaster base. Fiber board is easily cut to a tight fit with the window frame and makes a good air-stop.

Other Types of Wall

Many other wall constructions than the framed type are available but most of these are subject to fewer imperfections in construction. In building solid masonry walls there is a fair uniformity of workmanship in bonding, such as is found in brick, stone, concrete, etc. With masonry walls built up of different materials, such as brick face with concrete or tile backing, or stone face with brick or tile backing, care should be exercised especially in the bonding between the face and the backing. In too many cases the bond between these two is more or less imperfect and they act independently of each other. This condition should be avoided since it tends to make a weak wall. On the inside, masonry walls should be furred and plastered to be free from cold and dampness.

Brick veneer walls are usually in connection with framed interiors. The outside is always of face brick set off from the house wall, which is the regular framed wall with the lap siding omitted. The bond between the two is usually bent metal strips with one end nailed to the sheathing and the other embedded in the mortar joints. The space (usually $\frac{3}{4}$ -inch) between the brick and the frame may or may not be filled with mortar. With this space filled, as in eastern practice, the wall is stronger but its insulating qualities are less than when the space is left unfilled. The present tendency is toward a filled space. In either case the paper on the outside of the sheathing should be first grade and waterproof to keep the sheathing and framework dry.

A brick veneer wall has all the qualities to be desired by any house owner. To the observer on the outside this is a brick house. To those who inhabit it, it is a framed house, with the usual uniform air conditions accompanying such construction.

A stucco exterior may have a masonry wall as back-

ing, but usually it is a framed wall, as in the brick veneer, with stucco on the outside of the building paper. The stucco is held on by a binder of wood or metal fastened to the sheathing, and the building paper should be the very best waterproof grade to protect the sheathing underneath.

Windows

Loose workmanship is too often found around the standard window frame and between the sash and the frame. Considerable air inleakage takes place here. There is little excuse for the loose, rattling windows so frequently found in building construction, unless to emphasize the importance of metal weather-stripping the windows. In the absence of good workmanship, which seems difficult to obtain, metal weather strips are being resorted to by many as the only real solution of a serious problem.

In localities where the winter winds are very severe, much of the window losses may be overcome by storm sash. By many persons these are preferred to weather-stripping. In northern climates all the windows and in more moderate climates only the windows on the sides of the house subjected to the heaviest winter winds are protected in this way. In this section of the country (middle-west) the heaviest winds are from the north and west. A storm sash, in connection with the regular window, provides double glass with an air space between and is thus better insulation than a single glass. The insulating value of the air space, however, is dependent upon the quality of workmanship in fitting the storm sash in place. A loosely fitting sash fails of its purpose.

Storm sashes are from 1- to 1½-inch thick and may be hung for opening if desired. In such cases a top-swing sash is the best arrangement, with a device on the lower rail to hold the sash open. With the upper window sash lowered a few inches and the top-swing storm sash open below, a very satisfactory ventilating arrangement is provided. This provides natural air circulation to and from the room, sheds the rain, and eliminates much of the dust that would enter the ordinary window.

Night Air Cooling

(Continued from page 45)

and permitting the selection of one or several grilles for the same fan capacity is used by several manufacturers. This table is shown.

Approx.		Number of Registers To Be Used					
Fan Capacity C.F.M.	Total Area of Register in Sq. Ft.*	(Size in Inches)†					
		1	2	3	4	5	6
750	3	16x28	.....	.....	.....	.....	.....
1400	6	24x36	16x28	14x22	.....	.....	.....
2300	10	38x38	24x36	16x28	14x22	.....	.....
3200	14	.....	28x36	20x32	16x30	16x28	14x22
4100	17	.....	.....	24x36	20x32	16x30	16x28
7300	30	.....	.....	38x38	28x36	24x36	24x32
9000	40	.....	.....	.....	38x38	30x40	28x36
12000	50	.....	.....	.....	.....	38x38	30x40

*Register sizes are based upon the assumption that a register has 50 per cent free area of opening. For other areas drop down one size.

†Register sizes and numbers are based upon the use of 500 feet per minute velocity through the register face. For higher velocities reduce register one size or more as required.

it's a fact!



That

COOK HEAT CONTROL

Is Growing In Popularity Every Day Because It is EFFICIENT . . . NOISELESS . . . SAFE . . . GUARANTEED . . . PRICED RIGHT . . . and Sold under a

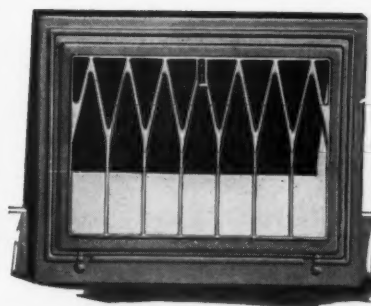
Merchandising Policy that Protects the Dealer

Full Information On Request

COOK ELECTRIC CO.

2700 Southport Ave.

Chicago



WINNER
MODEL

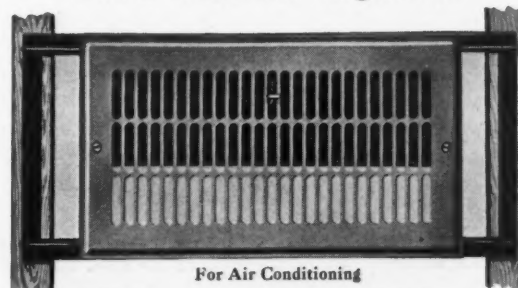
Two Piece
No. 800

The AUER REGISTER CO.

3608 PAYNE AVE.

CLEVELAND, OHIO

Send for new Catalogue of Gravity
and Forced Air Registers.



For Air Conditioning

CLASSIC Register (with Valve)
No. 2010 for WALL, Slide Frame ¾" Deep
No. 2020 for BASE, Slide Frame 1½" Deep



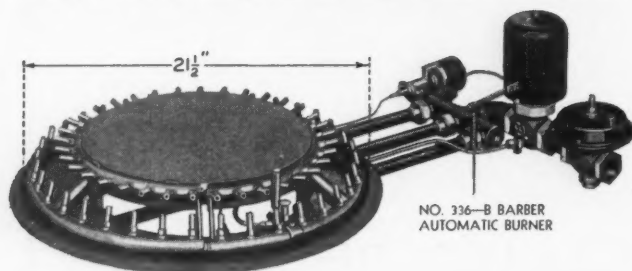
For furnace manufacturers who buy wheels only, Clarage offers any size desired, and can meet any quantity requirement. Clarage Wheels can be furnished standard width, or any percentage of standard width to deliver a specified volume of air at any operating speed. All wheels are PERFECTLY BAL-

ANCED for quiet operation without vibration. Clarage Furnace Fans (complete assemblies) combine many advantages. They are positive centrifugal type, very compact, highly efficient, and the low speeds insure SILENT OPERATION. Inlets and outlets are drilled with holes for easy attachment to ducts.

Clarage Fan Company, Kalamazoo, Michigan

CLARAGE
Air Handling and
Conditioning Equipment

• On Your "Difficult Jobs" •
Use BARBER BURNERS!



SPECIFICATIONS, not advertising superlatives, make conversion burners SELL and STAY SOLD. Compare Barber design, construction and performance record with those of any other gas conversion burner on the market.

Tailor-made to suit and fit the grate dimensions of round or oblong furnaces, or boilers. Insure proper scrubbing flame action on side walls of firebox. Equipped with Klixon or Baltimore Safety Pilot for positive and accurate control. Listed in the A.G.A. Directory of Approved Appliances.

Write today for New Illustrated Descriptive Bulletin and Revised Prices.

THE BARBER GAS BURNER CO.
3704 Superior Ave. Cleveland, Ohio

BARBER *Automatic* **JET GAS BURNERS**

for Warm Air Furnaces,
Steam and Hot Water Boilers

Research Residence Facts

(Continued from page 34)

- b. Commercial instruments of radically different construction are available, but the units of measurement are the same as those for the liquid gages.
- c. For measurements of pressures over 3 inches w. g., the U tube type shown in Fig. 4 is used. For ordinary measurements of pressures up to 3 inches w. g. the inclined manometer type shown in Fig. 3 is used. For extremely precise measurements of air pressures, laboratory instruments of the Shattock, and Wahlen types are available. Such instruments are not suitable for field work.
- d. The inclination of the tube, in the type shown in Fig. 3, enables the observer to make closer estimates of the liquid elevation than is possible with the use of the U tube.
- e. Kerosene and other liquids, which are lighter than water, are commonly used in commercial gages. The readings, however, are usually in terms of "inches of water." Such gages have a vertical elevation greater than that required when water is used in the gage, as shown in Fig. 5. Such gages should be filled only with the liquid specified by the manufacturer of the gage. (In case water is inserted in a gage made for a

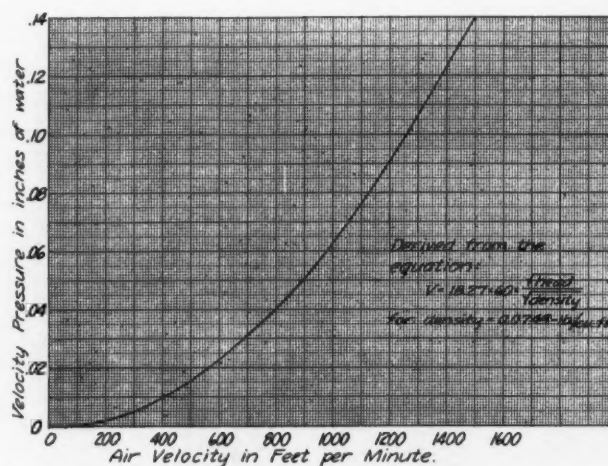


Fig. 6—Relation between velocity pressure and air velocity.

liquid having a density of 0.8, the actual pressure readings should be multiplied by 0.8 to obtain a corrected water gage reading.)

- f. Gage connections should be absolutely air-tight. In general, gages having complicated metal fittings should be avoided. The simplest, leak-proof connection is that made with rubber tubing.

Rubber hose connections from the gage to the measuring tube, such as that shown in Fig. 1, should be short, direct, and without kinks.

Velocity Head and Velocity

As indicated previously, a direct relation exists between the velocity of air and the head, or pressure, which would be obtained if the air motion was sud-

SUMMER-WINTER THERMOSTATS



A single instrument instead of two for the automatic control of cooling equipment in summer and heating equipment in winter, by means of manual switch built into case and ready-interwired. The snap-acting, spring blade contacts insure **freedom from chatter and vibration. Total differential of only 1° F.** Equally suited for low or line voltage. Beautiful in design. Satin Silver or Bronze finish in anodic Alumilite, and therefore unaffected by acid or alkaline corrosion, scratches, etc.

TYPE T/5W—Used to give reversible cycling on 2-wire control circuits.
LIST PRICE\$18.50

TYPE T/66—Used to give reversible cycling on 3-wire control circuits.
LIST PRICE\$18.75

TYPE T/45—Used to operate TWO SEPARATE LOADS.
LIST PRICE\$18.75

Apply for details of our complete line of instruments for control, indication, and recording of air conditions for all purposes. Attractive Bulletin on request.

JULIEN P. FRIEZ & SONS, INC.

(Subsidiary of Bendix Aviation Corporation)

Baltimore, Maryland

↑ ↑ ↑ ↑ UP
DOWN ↓ ↓ ↓ ↓



RIGHT → → → →
← ← ← ← LEFT



Any Angle to 45°

with

I N D E P E N D E N T

"Fabrikated"

**ADJUSTABLE Directed Air Flow
REGISTERS and GRILLES**

For Forced Air Installations

Adjustable Grille Bars can be easily adjusted before or after installing. Get the complete story. Write today for big, illustrated catalog.

INDEPENDENT REGISTER & MFG. CO.
3741 E. 93rd ST. CLEVELAND, OHIO

AMERICAN STEEL SHEETS

FOR ALL KNOWN USES

In Industry and Construction

Use sheets of recognized reputation and value. For roofing, siding, gutters, spouting, air conditioning systems, and general sheet metal work — Keystone Copper Steel gives maximum rust resistance.

Insist upon AMERICAN Black Sheets, Keystone Rust Resisting Copper Steel Sheets, Apollo Best Bloom Galvanized Sheets, Galvannealed Sheets, Heavy-Coated Galvanized Sheets, Formed Roofing and Siding Products, Tin Plates, Terne Plates, Black Plate, Etc.

Write us relative to your sheet steel requirements. This Company also manufactures USS STAINLESS and Heat Resisting Steel Sheets and Light Plates for all purposes.

AMERICAN SHEET AND TIN PLATE COMPANY, Pittsburgh, Pa.

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

SHEET METAL MEN!

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GAR WOOD dealers want to cooperate with established sheet metal workers in getting residential oil heating and air conditioning business. Names of prospective purchasers furnished by sheet metal workers will be given prompt attention and your interest will be duly safeguarded by our dealers during the sale negotiations. GAR WOOD dealers will furnish engineering layouts for residential heating and air conditioning systems. Take your jobs to the GAR WOOD dealer. Have him make a layout for you to figure the sheet metal cost. Free literature furnished promptly on request . . . write us today.

Air Conditioning Division
GAR WOOD INDUSTRIES, INC.
7924 Riopelle Street
DETROIT · MICHIGAN

Owners say GAR WOOD Heat costs less than coal

MONARCH SPRAYS



AIR CONDITIONING

For fine atomizing sprays we recommend $\frac{1}{4}$ " Fig. H-261 (shown above) or Fig. 642 ($\frac{1}{4}$ " or $\frac{1}{8}$ " female pipe) brass nozzles. These nozzles produce the finest spray possible with direct pressure. Capacities from .57 to 18.17 G. P. H. at 40 lbs.

BULLETIN NO. 20

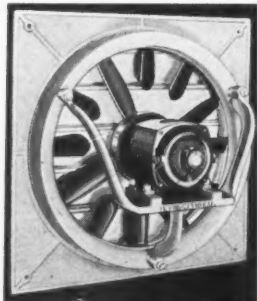
AIR WASHING

Where a relatively coarse spray is desired Monarch "non-clog" nozzles are recommended. One large lead hole entering swirl chamber minimizes any clogging tendencies. Standard in $\frac{1}{4}$ " and $\frac{3}{8}$ " female and $\frac{3}{8}$ " male pipe thread brass.

CATALOG 6-C

MONARCH MFG. WORKS, INC.
3303 SALMON STREET
PHILADELPHIA, PA.

INTERNATIONAL Air Cooling



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Homes and Apartments
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Aug. 6	Rochester	Seneca		
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Aug. 27	Des Moines	Ft. Des Moines		
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PENN ELECTRIC SWITCH COMPANY, DES MOINES, IOWA

denly stopped. This mathematical relationship is expressed as:

$$\text{Velocity head} = \frac{(\text{Velocity})^2}{2g}$$

Stated in terms of more familiar units, the above equation reduces to:

$$\text{Velocity, in ft. per second} = \frac{18.27\sqrt{\text{head}}}{\sqrt{\text{density}}}$$

By substituting proper values in the second equation, we are able to obtain values of velocity head corresponding to various velocities. These values are shown in Fig. 6 and tabulated as follows:

TABLE I
Velocity Pressure Created by Air Velocity
(See Fig. 6)

Air Velocity		Velocity Pressure
Feet per second	Feet per minute	Inches Water
0	0	0
1	60	0.
2	120	0.001
3	180	0.002
4	240	0.003
5	300	0.005
6	360	0.008
7	420	0.011
8	480	0.014
9	540	0.018
10	600	0.022
12	720	0.033
14	840	0.044
16	960	0.058
18	1080	0.073
20	1200	0.09
25	1500	0.14
30	1800	0.20
35	2100	0.27
40	2400	0.35
45	2700	0.45
50	3000	0.56
55	3300	0.68
60	3600	0.81
65	3900	0.94

Note: These values are for 70 deg. F. and 29.92 in. mercury barometric pressure or an air density of approximately 0.075 lb. per cu. ft. For other air densities a slight correction is necessary.

It may be noted that as the value for the air velocity increases, the corresponding value for the velocity pressure or velocity head increases very rapidly. An air velocity of 2 ft. per second or 120 ft. per minute has approximately 0.001 in. velocity pressure; whereas an air velocity of 6 ft. per second or 360 ft. per minute has approximately 0.008 in. velocity pressure. It should also be noted that for air velocities up to about 600 ft. per minute the velocity pressure is relatively small. For air velocities above 600 ft. per minute, however, the velocity pressure is of fair-sized magnitude.

Pressure Loss in Terms of Vel. Press.

At this point of the discussion very little practical use of the table can be made. It will be referred to in later articles, however, and is of great interest because data on pressure losses of various fittings and equipment are often expressed in terms of percentage of velocity pressure. For instance a sharp-cornered bend may be considered as imposing a frictional resistance of "1.0 velocity pressure." By referring to the table or to Fig. 6 it can easily be seen that the given section offers a resistance of 0.001 in. water gage when the air velocity is 120 ft. per minute, and offers a resistance of 0.008 in. water gage when the air velocity is 360 ft. per minute. Similarly the resistance at any other air velocity can be readily obtained from the table.

Another duct section may impose a resistance equal to "0.5 velocity pressure" or "0.5 V. P." At an air velocity of 360 ft. per minute the section offers a resistance of one-half of 0.008 in. or 0.004 in. w. g.

The table and Fig. 6 can also be used when the velocity of the air flow is known, or can be measured by an anemometer, and the corresponding velocity pressure necessary to create that velocity is desired. For instance if anemometer readings at a register face indicate a velocity of 500 feet per minute, Table I indicates that the velocity pressure of the air as it is ejected into the room is of the order of 0.016 in. water gage.

Other uses for the table and Fig. 6 will be indicated in a later section.

Controls For Cooling

(Continued from page 40)

nothing by trying to complicate the control system.

If we have a spray ice water tank the usual arrangement is to have a pump which withdraws cold water from the bottom of the ice tank and forces this cold water through the coil. From the coil chamber the same pump withdraws the water used to cool the air and forces it through the sprays of the ice storage tank. In this way one pump handles all the water service.

If instead of coils we use sprays in a washer to cool, our main pump will not return water from the washer to the ice tank sprays so we must use a second pump. The pump can be controlled by a float contact which starts the pump whenever the water level in the washer reaches a high point and stops when the water level falls.

If we are using an ice storage tank with the ice immersed in a tank full of water and coils our thermostat will control a pump which withdraws cold water from the tank and forces it through the coil. In this case the thermostat controls the pump directly, starting the pump when the house has to be cooled and stopping the pump when the thermostat is satisfied.

With the controls outlined up to this point in mind the contractor can select the control system best suited to the particular problems and apparatus. Back of these brief suggestions, however, we find a number of highly interesting problems which challenge consideration. We will dwell for a few paragraphs on some of these problems.



3

**New Bulletins On
AIR CONDITIONING**

... for the manufacturers and dealers of air conditioning equipment. Have last minute data at your finger tips—condensed and reliable—on air handling motors and blowers. Send immediately to Department 6 for bulletins.

Peerless
ELECTRIC COMPANY
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WARREN, OHIO



FRONT RANK **FRONT RANK**
HEATING SYSTEMS

**AIR CONDITIONING
HEATING SYSTEMS**

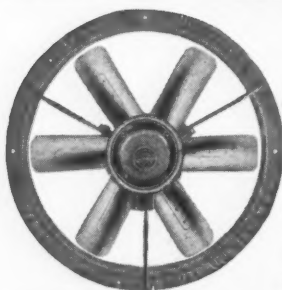
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Today, home owners are insisting on heating equipment that will condition air as well as distribute even heat at proper temperatures throughout the entire house. The educational work that has been done along these lines has opened a new and more profitable field. Be ready to cash in on the demand. Get complete information on the new and improved FRONT RANK Air Conditioning Heating Systems. Humidifying and temperature controls entirely automatic. Adapted to oil and gas burners, automatic coal stokers or can be hand fired. Write today.

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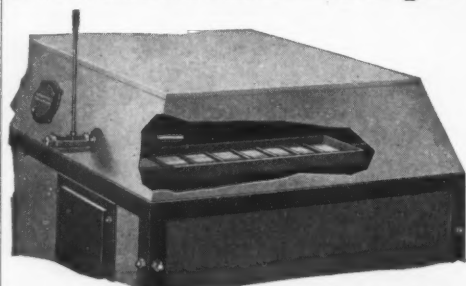
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AN AUTOVENT PRODUCT

Install the AUTOMATIC DRIP HUMIDIFIER--and get results



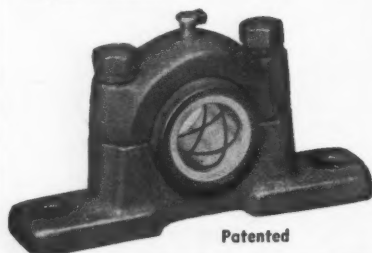
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Important
Part of
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Is Humidity

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Sizes for All Furnaces—Low Prices
Automatic Humidifier Co. Cedar Falls, Ia.

- Randall Pillow Block installations give years of trouble-free service. They are quiet. They are reliable. Standard equipment of leading manufacturers. Ball machined and races ground, thus insuring an accurate fit.

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PRODUCTS CORP.**
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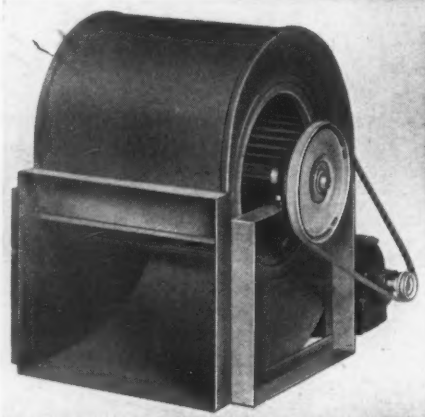
First of all let us consider the house. To do a satisfactory job of cooling (and this means an economical job) the house must be seriously considered. If it stands exposed to the full sun all day, if it has no awnings, no insulation, gets little breeze—we can be sure that any cooling plant we install is going to have a real task cut out for itself. Every piece of apparatus must be greatly increased in size to handle the cooling load.

To be sure that the plant will cool and that the cost will not be excessive, the contractor should try to persuade the owner to invest in the things which reduce cooling cost. Awnings are relatively cheap. They should be placed on *east and west windows without fail* and on the south windows secondarily. If this sounds peculiar consider that in most of the cooling area the sun is directly overhead during much of the day, but hits the house full in the morning and afternoon.

The best picture of cost savings brought about by awnings comes from the Research Residence staff at the University of Illinois and shows that awnings on three sides reduce the total cooling load at least 21 per cent in average weather and during 95 degree weather or hotter may reduce the cooling load as much as 30 per cent. These reductions ought to appeal to every owner.

The savings in cooling load brought about by the use of insulation is equally forcible. Where second floor rooms are to be cooled; or where rooms under a roof are to be cooled; use of ceiling insulation effects just as noticeable a reduction in heat transfer in summer as in winter. Whereas in winter ceiling insulation prevents heat from inside escaping to the attic or outside—in summer ceiling insulation prevents or retards heat penetrating from the outside. The reduction in cooling load through the use of ceiling insulation is probably in the neighborhood of 20 to 25 per cent. Additional savings (although not so sharp a reduction) is effected when walls are also insulated.

In this connection it should be stated that while insulation does reduce the cooling load any house will eventually heat up if the hot spell is prolonged enough. Tests show that insulation retards the inside temperature rise so that with insulation the house may not reach its peak indoor temperature until several hours after the maximum outdoor temperature.



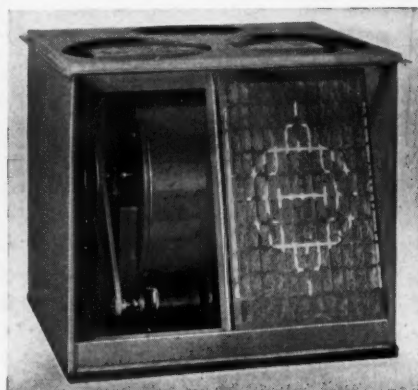
PROPERAIRE

A Modified Air Conditioner
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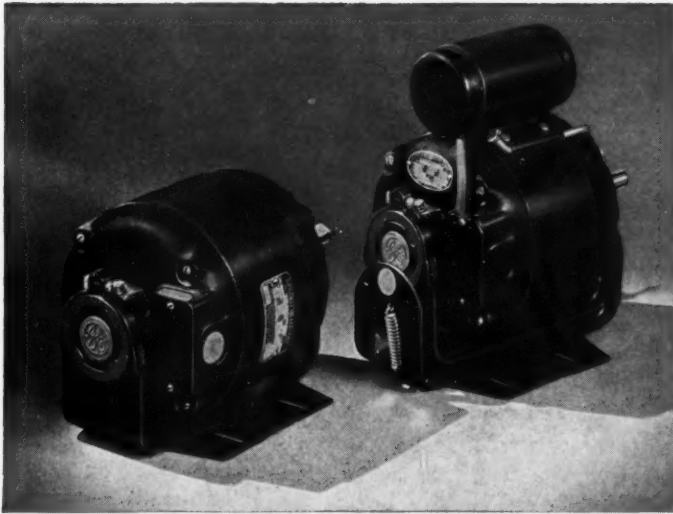
Get the facts about Properaire Furnace Blowers for Modified Air Conditioning, including filtering. Installation costs are low for either new or old systems. Properaire comes in 3 fan sizes . . . 10, 12 and 16 inch. Gives efficient heating when furnace is operating and lowers temperatures in summer months.

Write for Prices and Data

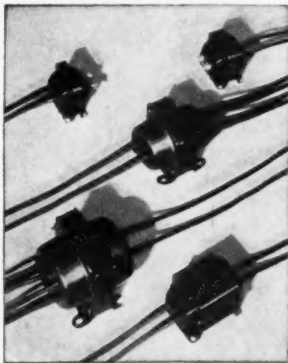
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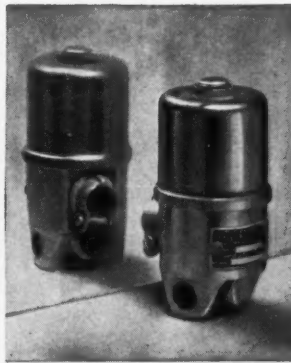
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G-E CONTROL
TRANSFORMERS

Choose G-E control transformers for safety, convenience, and simplicity of wiring wherever small solenoids, relays, motors, lamps, and similar accessories needed for an air-conditioning installation must be operated at various voltages—stepped down from the lighting circuit.

General Electric's complete line of small control transformers makes operation at reduced voltages as simple as a, b, c.

There are standard G-E control transformers for many applications; your requirements for special voltages can be economically and quickly met from an extensive line of standard parts. Why not ask us for information on these control transformers?

G-E SOLENOID
VALVE

Ideally suited to air-conditioning needs, this new electric valve will handle water or low-pressure steam quickly, easily, and economically, by remote control.

It provides positive operation over a wide range of pressures and temperatures. It is economical—uses only $7\frac{1}{2}$ watts at 110 volts, 60 cycles. Its parts are sealed in steel—no stuffing box. A handy, built-in terminal box saves installation expense. A convenient metering pin provides 50-percent flow regulation—no extra valve is needed.

Wherever you have a big job for a little valve, this device will save you money. Would you like further information?

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WITH G-E MOTORS

WHEN you present your next installation proposition, tell the prospect that you would like to use G-E electric equipment—motors, control, cable, etc. You won't have to sell him on their desirability. He's already convinced that G-E products are *high-quality* products. *The reputation of G-E equipment will help you sell.*

For example, General Electric offers you . . .

CAREFREE-MOTORS . . . EASY TO INSTALL . . . SIMPLE TO MAINTAIN . . . DEPENDABLE

Type KH resistance, split-phase motors for belt-driven fans and blowers requiring up to $\frac{1}{4}$ hp.; Type KC motors for the same class of service where the horsepower required is from $\frac{1}{3}$ to 10 hp. Within the fractional-horsepower range, both types have the following advantages:

LARGE OIL SUPPLY—Minimizes lubrication attention—once-a-season oiling is all that's needed.

BELT TIGHTENER (optional)—This new, radically different belt tightener depends on torque, and not on springs, for its action. It eliminates service calls for belt tightening or premature belt replacement—saves you money on that feature alone.

CUSHIONED POWER—Helps your installation set an agreeably new standard of quietness. Durable, springy rubber mounting, securely clamped in place, isolates vibration—eliminates unnecessary noise.

You can get G-E motors—small and large—in every type and size for every air-conditioning need. Our motor specialists—in a G-E office conveniently near you—will gladly help you choose. General Electric, Dept. 6—201, Schenectady, New York.

070-102

GENERAL ELECTRIC

The AMERICAN RENU-VENT AIR FILTER



The American Renu-Vent Filter equipped with the new Progresso-Pak Filter Pad is far ahead in performance when compared with any other similar filter on the market today. The improved Progresso-Pak filter pad is progressively packed, with fine split wire backing up a coarse medium, and coated with a newly developed liquescent adhesive which maintains a heavy viscous film on each individual wire. The use of the single Progresso-Pak filter pad not only lowers resistance 48% but increases dust holding capacity 20% and contributes the further advantage of a 25% longer life.* Write for bulletin No. 205-B containing complete description and comparative performance chart.

*Tested in accordance with Standard Air Filter Test Code of American Society of Heating & Ventilating Engineers.

Here's How!



This improved RENU PAD has eliminated the difficulties common to all renewable filters and has established a new high standard of performance for this type of equipment. The Renu-Vent Filter costs no more than other types; is easily installed because no supporting frame is required; and lowers maintenance costs since only the pad is renewed.

AMERICAN AIR FILTER COMPANY, Inc.
113 CENTRAL AVENUE IN CANADA, DARLING BROTHERS, LIMITED, MONTREAL, P. Q. LOUISVILLE, KENTUCKY

AMERICAN AIR FILTERS

For your convenience a number has been assigned each item. Check the items in which you are interested on the coupon on page 70 and mail to us. Complete information will be forwarded.

● Indicates product not listed in 1935 Directory

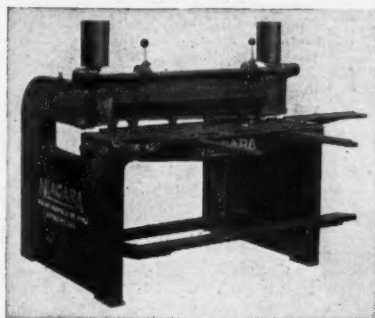
△ Indicates product and manufacturer not listed in 1935 Directory

NEW PRODUCTS

159—Foot Gap Shears

Niagara Machine and Tool Works, Buffalo, N. Y., announce a new line of squaring shears with gap in the housings and for foot operation. Gap permits cutting sheets longer than the cutting length of the shear. These shears are made in five lengths for cutting sheet metal up to 16 gage in thickness.

Among the features claimed for this machine—ease of operation, portability, rigid construction, accurate cutting, com-



plete accessibility at the back of the machine for easy removal of sheared pieces and for setting gages. Housings are one-piece, closed-panel, semi-steel castings. The steel holddown is operated by eccentrics manually controlled and exert heavy pressure on the metal to be cut, thus assuring accuracy. The holddown is so designed that the cutting edge is visible for locating sheets for hearing to a line.

● 160—Refractory Concrete

A new type of "Firecrete" for casting light-weight refractory concrete on the job is announced by Johns-Manville. Known as Light-Weight Firecrete, this new product is composed chiefly of high alumina clay calcined at high temperatures. The resulting concrete weighs only 75 lbs. per cu. ft. Under continuous operation at 2400° F., shrinkage is so slight as to be entirely negligible. It has withstood the most severe alternate heating and cooling tests without spalling.

L. W. Firecrete is 40% lighter than fire brick and has 40% lower heat storage capacity. This feature is of particular importance on intermittent furnaces which can be brought up to temperature in a much shorter time with less waste of heat each time the furnace cools. Because the thermal conductivity of the new material is considerably less than half that of fire brick, radiation losses are also reduced.

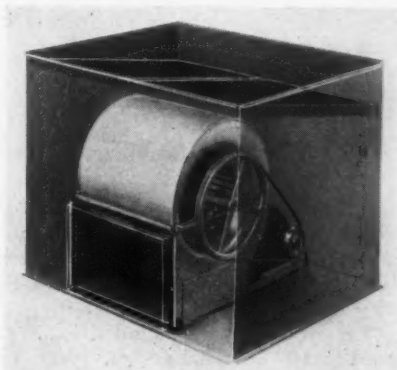
161—Conditioning Furnace

Two new air conditioning furnaces, to be known as the Airmaster, are announced by the Ideal Furnace Company, Detroit, Michigan. One furnace is for coal burning, the other is for oil. Both furnaces consist of combustion sections with suitable radiators, filters and a centrifugal type blower with belted motor all housed in one rectangular casing supplied in green finish with bright metal trim. The oil burning furnace is adaptable to all standard oil burners.

The coal fired air conditioner may be had also in a cast furnace with a capacity ranging from 90,000 B.t.u. to 160,000 B.t.u. The steel furnace ranges from 137,000 B.t.u. to 249,000 B.t.u. The oil burning furnace is rated from 155,000 to 305,000 B.t.u. The company is also manufacturing a conversion blower unit consisting of a blower and motor with a spray chamber and scrubber plates. This unit may be connected directly to an existing gravity system.

◆ 162—Fan-Filter Unit

L. J. Mueller Furnace Company, Milwaukee, Wisconsin, announces Climator V, a dependable fan and filter unit specially designed to meet the volume demand for popular-priced fan and filter unit. Climator V has the same basic design as all previous Climator fan units. The new

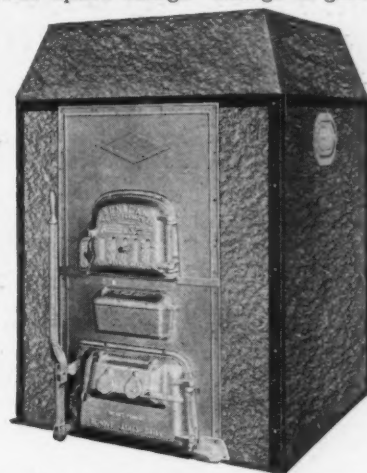


unit will be made in two sizes, rated 1600 and 2400 C.F.M. against 1/8-inch static pressure and 1000 and 1500 c.f.m. against 1/4-inch static pressure.

The blower is of the multi-blade type with both fan and motor mounted on angles which rest on the basement floor. Drive is by V-belt and pulleys which may be changed to alternate speeds. Filters are of the semi-permanent type with a replaceable filter pad. A furnacestat to start and stop the fan is included.

163—Square Cased Furnaces

The Fox Furnace Company, Elyria, Ohio, a division of American Radiator and Standard Sanitary Corporation, has recently announced that its line of Sun-beam gravity furnaces is now available with square casings. Casings of galvan-



ized iron, or in red and black crystalline baked enamel, are obtainable.

Inside of the square exterior casing is a round inner casing within which all the circulating air passes. This double casing construction is said to insure that circulating air will be heated uniformly, and that all runs leading from the furnace will receive air of the same temperature.

◆ 164—Window Ventilator

Kaiseraire Products Sales Company, 936 West Chicago Avenue, Chicago, Illinois, announce the Kaiseraire window-type ventilator made in two models for rooms from 15 to 20 feet square. The small model has one fan; the large model two fans. The large model filters from 100 to 400 c.f.m. while the small model filters 50 to 200 c.f.m. Directional flow grilles are provided in both models to control the air stream. Controls are also attached for changing the motor speed.

◆ 165—Steel Float

A welded steel float, chromium plated, for steam traps, water columns, tanks, float valves, and any type of liquid level control, is announced by W. H. Nicholson & Company, 209 Oregon Street, Wilkes-Barre, Pennsylvania. The floats are manufactured in a range of sizes and shapes and to withstand pressures up to 2500 pounds. All floats are made of two halves of special alloy steel, die-formed and welded by special process.

New Products . . .

166—Conditioning Furnace

Gar Wood Industries, Inc., Detroit, Michigan, announce a new, smaller Tempered-Aire Unit, developed especially for the average home of six or seven rooms and constructed with blower cabinet and



furnace as one compact unit which will occupy a minimum of space in small basements. The pressure atomizing type burner is suitable for No. 3 oil, yet free from all smoke.

167—Spot Welders

The Pier Equipment Mfg. Co., 1250 Milton St., Benton Harbor, Mich., announce a new line of electric spot welders, smaller than most spot welders, but built to stand up under continuous production on jobs where from 16 to 26 gauge steel is used.

These welders can be used in sheet metal, sign, and job shops.

Two models are available. The No. 40, complete with foot pedal control and steel stand, for 110/220 volts, 60 cycles, will handle up to 600 welds per hour on



24 gauge steel. The No. 50, complete with foot-pedal control and steel stand, for use on 220 volts, 60 C., will handle up to 1,200 welds per hour on 24 gauge, and about 600 welds per hour on galvanized iron. Informative literature may be obtained by writing the manufacturers.

168—Limit Controls

Three new limit controls are announced by the Russell Electric Company, 342 West Huron Street, Chicago, Illinois.

These switches all employ the Hold-Heet rod and tube mechanism and are rated for 15 amperes, A.C. for either line or low voltage—made possible by the magnetic blow out and the quick make-and-break action employed.

The duct thermostat has the greater length of the tube for introduction into a warm air duct, and the differential of the switch is only 2°. These switches have three terminals so as to make them universal in use. They may be used to close a circuit on a rise in temperature such as would be employed when operated as a fan switch by using the blue and white terminals only. They may be used to open the circuit on a rise in temperature as employed in the ordinary limit



controls circuit by using the red and white terminals only.

A heavy steel bushing is permanently attached in the base of the switch so that the line voltage wiring may be easily attached. A molded insulating bushing is also supplied with the switch in case it is to be used on a low voltage circuit.

These switches may be mounted in any position.

169—Draft Recorders

The Hays Corporation, Michigan City, Ind., announces a new line of Series "OT" and "OH" draft, pressure and differential recorders for ranges between .1 inch of water and 100 inches of water, total scale.

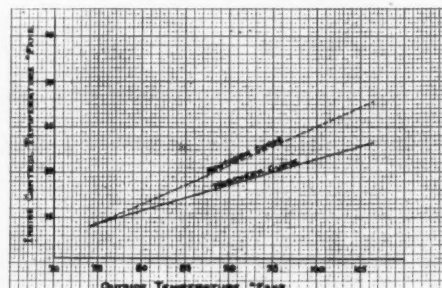
The recorders are mounted in dust-tight cases of new design, made of cast iron. Dimensions of the unit are 13 inches wide, 14 inches high and 7 inches deep. Standard charts for the recorders may be obtained from the company.

The recorders are furnished in either single pen or two-pen types. In the two-pen recorder the longer pen records approximately five minutes ahead of the shorter pen. The operating mechanism consists of the Hays dry type diaphragms, which are self-sealing and contain no liquids.

170—Thermostat

While the A. S. H. & V. E. "Comfort Curve" marks very closely the relative amount of cooling needed in the Northern part of this country to assure comfort indoors during the hot weather, it is generally recognized that the temperature range is too low for maximum comfort throughout the Southern states, where both temperature and humidity are appreciably higher during the summer season.

The accompanying chart indicates the difference in relative comfort tempera-



tures for the two regions. The lower curve is the A. S. H. & V. E. "Comfort Curve" which coincides with the cooling demands in the North. The upper curve represents the desired comfort conditions in the South.

This situation presents a problem in temperature control practice. This problem is answered by the "Genuine Detroit" Differential Thermostat No. 691, manufactured by the Detroit Lubricator Company. This instrument is supplied in either a Northern range corresponding to the A. S. H. & V. E. curve or a Southern range corresponding to the upper curve in the chart previously mentioned.

By a simple factory adjustment, these temperature ranges may be shifted up or down slightly if desired. This adjustment, when made, changes all points on the curve by an equal amount. It will be necessary only to meet special conditions.

171—Waterproofing Sections

Two new lines of waterproofing sections—"Spando" waterproofing designed especially for use above lintels and sills and a copper pre-formed shower pan—are announced by the Cheney Company, Winchester, Massachusetts.

The Spando copper membrane is flexible and can be formed to any shape by hand. The waterproofing consists of a continuous layer of three ounce copper bonded to a five ounce canvas which is saturated and coated with asphalt and surfaced with crushed mineral. The material is furnished in rolls to enable the contractor to cut the membrane to the proper length. The usual rolls are 40 feet long and are furnished in standard widths of 8, 10, 12, 14, 15, 16, 20, and 30 inches. The material is laid dry with copper side up without plastic asphalt or other adhesive.

The shower pans are built of 16-ounce dovetail keyed copper with reinforced corners. The pans are furnished ready to install and in standard shower sizes. Full descriptions of both of these new products are contained in literature which the manufacturer has prepared.

New Products

172—Spray Conditioner

A new air conditioner, to be known as Spraywheel, is announced by Spraywheel Air Conditioners, Inc., 1226 California Street, Denver, Colorado. The conditioner consists of a double section housing, one side containing the blower and motor and the other an impeller wheel for producing finely atomized sprays and a tank



from which the spray wheel draws the necessary water. The spraywheel rotates in a trough propelled by a small motor and spins out twenty or more sheets of finely divided spray. The spraywheel does not dip into the water but the water is fed from a pan having a float valve. Only sufficient water to maintain a level in the pan is introduced into the cabinet, thus increasing the temperature of the spray water produced by the wheel. The

unit is said to have a capacity of from 10 to 20 gallons of water evaporated every 24 hours. The unit is so designed that it can be used in connection with an existing warm air heating system or can be used as an independent conditioner for radiator heated homes.

Literature showing and describing the item and giving several suggested installation diagrams has been prepared by the manufacturer.

173—Snowguard

A new adjustable pipe snow guard for slate roofs, especially designed for residences or other buildings having slate roofs with rafters not over 18 feet long and adjustable for any pitch of roof, is announced by David Levow, 308 West 20th Street, New York City.

The new guard is made of cast bronze with copper plate two inches wide using two one-half inch standard brass pipes. The plate is fastened to the roof with copper nails.

The manufacturer has prepared mimeographed sheets describing and showing the item.

174—Arc Welder

A new, small, low priced motor generator type of arc welding machine especially suited for sheet welding is announced by The Lincoln Electric Company, Cleveland, Ohio.

Known as type SA-100 this new welder generates the low current necessary



for arc welding sheet metal. It delivers as low as 30 amperes at the arc without the use of auxiliary devices.

The new SA-100 is of motor driven type, with a current range of 30 to 125 amperes. The generator is of single operator variable voltage type with 100 ampere NEMA rating. Easy welding is assured by patented dual control. The motor is the Lincoln "Linc-Weld" five horsepower squirrel cage induction type for across the line starting. The starter switch is of push button type. The new welder is normally 220 or 440 volts and can be furnished for 110 or 550 volts.

ANOTHER RYBOLT FURNACE

- IMPROVED
- EFFICIENT
- ABSOLUTELY
DUST-PROOF

This RYBOLT is practically "Streamlined." No sharp curves to offer resistance to the warm air traveling to its proper destination . . . the one-piece radiators with smoke and clean-out collars cast on, is definite proof of the great advance in RYBOLT furnace construction and engineering—

RYBOLT furnaces are "Service-Tested" . . . not only by laboratories but by the thousands of homes that are RYBOLT users.

THEY ARE BUILT TO WEAR . . . TO MAKE SATISFIED CUSTOMERS

THE RYBOLT HEATER COMPANY
Ashland Ohio



READY!
OUR NEW

FURNACE REPAIR PRICE LIST

NORTHWESTERN STOVE REPAIR CO.
CHICAGO, ILLINOIS

FURNACE REPAIR PRICE LIST

Most complete line ever offered
... it will be indispensable in your
daily work. To be used in con-
junction with our Catalog No. 45.

Use the coupon—send
for your copy today.

NORTHWESTERN STOVE REPAIR CO.
Manufacturers of Stove, Furnace and
Boiler Repairs to fit all makes
662 West Roosevelt Road
Chicago, Illinois

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NORTHWESTERN STOVE REPAIR CO.
662 West Roosevelt Road
Chicago, Illinois

Please mail me your new price list at once.

Name

Address

City State

News Items

Cleveland Heating Bureau

By Eugene P. Farris, Managing Director

THE Cleveland Central Bureau is an organization endowed by manufacturers, jobbers and suppliers of equipment in heating, ventilating, and air conditioning, both winter and summer, for the purpose of furnishing to the sheet metal and furnace installation tradesmen, in authenticity, the calculations of heat losses, primarily in the residential constructions. However, we do veer off into churches, schools, lodges, etc. The Bureau computes, designs, lays out and blue prints heating and air conditioning installations for \$5 per plan, regardless of their size, to encourage the dealer and installer to use authentic installation. The plans of course, can not be engineered and drawn for any such figure as \$5, however, the additional cost is absorbed by the endowed fund of contributors to the bureau.

The calculations for heating losses are figured in BTU's, and are based upon co-efficient factors taken from the American Society of Heating and Ventilating Engineers Guide and the Standard Code for mechanical forced air, and has been using for some time the extra factors for exposures, length of pipe and temperature differences. Our computation sheet is original in its design and simple in function. It carries on every job, in addition to the rooms by numbers and dimensions, the area to be considered, the factors for that arrival and the results of C.F.M. round pipe area, warm air rectangular duct, warm air registers, and of return air on the floor basic factor basis.

The writer, as managing director for the Central Bureau is an ex-officio member of the Board of Trustees of the Warm Air Furnace and Air Conditioning League Incorporated, which now has a membership of over 180 contractors from greater Cleveland and also he is an instructor to this class of men. Regular school classes in gravity and forced air and air conditioning, are held every Monday evening.

We are preparing for introduction to the City Council of Cleveland a standard code city ordinance, requiring all jobs to be according to the Standard Code. After the class work on gravity has been completed, we will go into the forced air code.

The Central Bureau further conducts a promotional endeavor by conducting lectures to churches, schools, lodges and associations, contractors, builders and architects on warm air heating and air conditioning. With the cooperation of architects we expect the specifications for all new house work to read, "Computation, Design and Layout to be by the Central Bureau."

The Bureau officially opened its doors on the 15th of May and has up to date, turned out over 100 plans for full layouts on air conditioning systems and has computed countless numbers of jobs for a service charge of \$1.50.

New York Adopts State Job Insurance

The New York State Unemployment Insurance Act was adopted April 25 to become effective January 1, 1936, covering all classes of workers with the following exceptions: farm laborers, non-manual employees earning over \$2500 a year, government and municipal employees, persons employed by employers having less than four employees, wives and minor children of employer employed by him, persons employed by religious, charitable, scientific and literary organizations.

Employers will contribute 3 per cent of the payroll to the state fund beginning January 1, 1936, collections starting March 1, 1936. These contributions will be collected on a basis of 1 per cent for 1936 and 2 per cent for 1937. There will be no contributions by employees. The benefit for employees amounts to 50 per cent of the current full-time weekly wage of the preceding year, but not exceeding \$15.00 per week and not less than \$5.00 per week. To participate in the plan, employees must have served a period of 90 days of insurable employment within the previous year or 130 days within the two previous years. Claimant is entitled to benefit after three weeks of unemployment. In case of discharge or misconduct the waiting period is 10 weeks. The Act will be administered under the jurisdiction of the Industrial Commissioner of the Department of Labor. Contributions will be invested in an Unemployment Trust Fund administered by a Federal agency.

NOW'S THE TIME TO GO AFTER Cleaning and Repairing Jobs!



SMART furnace contractors are educating people to have their furnaces cleaned and repaired immediately after the firing season. July is not too late. And when there's additional work to be done, remind your customers of Armco Sheet Metals. They're the top in iron and steel sheets; and there's selling power in the name "Armco," nationally advertised for 21 years. • Ask the furnace manufacturer to use Armco Hot-Rolled plates for the vital parts of his furnaces. Then you can finish the job up *right* with Armco Galvanized sheets—easy-working, long-lasting and favorably known to your customers. Your Armco Distributor stocks all commonly-used grades and is always ready to help you get business. Send him that order you are about to place.

THE AMERICAN ROLLING MILL COMPANY



Executive Offices • Middletown, Ohio

SHEET METAL WORKERS know this trademark as an unfailing sign of highest quality in iron and steel sheets, strip and plates. Behind it is 35 years of research, production and application experience.



Assures Easier . . . Quicker Immediate Installations

TAKE the Dam out of Damper jobs, with the Griswold "American." It's the only damper that gives you all these time-saving . . . temper-soothing features.

"Original Steel Spindle" easily pierces any stovepipe with a hole the size of the spindle. The hump on the spindle locks the damper in place. The nickel coil keeps the handle cool as a cucumber. Thru the "Original Reversible" plate, the spindle is quickly inserted from either side. The special nickel-finished steel ferrule, enclosing the spring, protects it from heat, adds extra years of service. To save you from the muss of shavings or straw, Griswold Dampers are packed in improved cartons (shown below) with contents plainly stenciled on both ends. The complete Griswold "American" line includes: Regular Sizes 3" to 7", Furnace Dampers, 8" to 18", Oval Dampers, 4" to 8".

Don't waste time on inferior dampers. Specify Griswold "American," manufactured and guaranteed by The Griswold Mfg. Co. of Erie, Penna.



*Original
Reversible
Original
Steel Spindle*

**Save Time... Bother... Space
ORDER IN NEW HANDY
CARTONS**

Now---

The First REAL Improvement In Ventilators In Years!



NEW
DESIGN
NEW
EFFICIENCY

THE "SYPHON-AIR"

And its "Just What the Name Implies"! Wind blows thru the two side spaces, (in the back and out the front) drawing (or "syphoning") the foul air, gases, etc., out of the building or room below.

Another of those things that makes you say: "Well, why didn't someone think of that before?"

This new, patented, ventilator is strongly made in all standard sizes from 8" to 48" diameter of Armco Ingot iron with bronze pivot-bearings. (See dotted line.)

The SYPHON-AIR is more positive—therefore more efficient—than other ventilators that depend entirely on gravity (or heat) for their action. It will "suck" out foul air, gas, smoke, etc., many times as fast because of the "syphon" features.

Write us for prices and details.

F. MEYER & BRO. CO.
PEORIA, ILLINOIS

News Items

Death of W. Roy Eichberg

W. Roy Eichberg, founder and head of the Carolina Sheet Metal Corporation, 4210 Sansom Street, Philadelphia, died a few days ago at his home in Drexel Hill, just outside of Philadelphia. Mr. Eichberg will be remembered by the entire industry as one of the fighting spirits of the code for our industry and as an individual who gave unsparingly of his time and money to advance the cause of general betterment throughout the industry. He underwent a serious operation last fall from which he never seemed to fully recover. Despite his diminished vitality, he continued to carry the heavy burden of code work in the Philadelphia area. In addition to maintaining his own business, Mr. Eichberg was a vice president of the American Society of Heating and Ventilating Engineers and had previously served as secretary of the association. In February, 1934, he was elected a member of the National Code Authority to represent Zone 4. At the time of his death he was serving his second term as president of the Associated Roofing, Metal and Heating Engineers of Philadelphia. Mr. Eichberg was born in Memphis, Tennessee, in 1887. Mr. Eichberg entered the warm air heating, ventilating and sheet metal business in Richmond, Virginia, with the American Heating and Ventilating Company, later transferring to Raleigh, North Carolina, in which city he founded the Carolina Sheet Metal Corporation as a manufacturer and contractor of sheet metal work. The business and the corporation was moved to Philadelphia in 1926 and soon became one of the leading ventilating and sheet metal shops in Philadelphia. Mr. Eichberg is survived by his wife and two young daughters and two sisters.

100 Year Old Karl Mech Passes On

One of the real old timers of the warm air heating industry, Karl Mech of Lombard, Illinois, who celebrated his 100th anniversary last January, died this month. Mr. Mech was identified with the furnace and sheet metal industry during practically all of his business life. His one wish in recent years was that he might live to reach the age of 100 years, a wish which he realized in January. A son, Otto K. Mech, carries on the traditional family sheet metal and furnace shop in Lombard.

Air Conditioning School

Approximately 100 dealers and jobbers of warm air heating and air conditioning equipment attended the recent air conditioning school staged by The Fox Furnace Company at Green Hill Farms, Philadelphia. The school extended over a period of 3 days during which time every one in attendance designed a complete air conditioning system for a set of residence plans which were provided them.

The balance of the school program included brief lectures on gravity warm air heating; residential cooling; air conditioning



controls; blowers and motors; air filters; and humidifying equipment.

Merchandising was not neglected. Talks were given on such subjects as, Selling the Architect; Who is the Air Conditioning Dealer; The Market for 1935; Time Payment Sales; and How to Make the Most of 1935 Sales Possibilities.

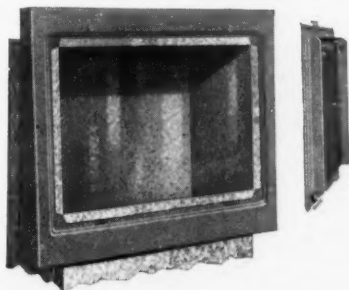


"Right you are Colonel. You see, those registers you saw at Jim Travis' house, and admired so powerfully, were H & C No. 110 registers. These are H & C No. 120. They look practically alike, but the

120 is built to be installed with the stackhead overlapping the frame—eliminating the chief cause of streaking. That's the way I like to install them; and I knew you'd be satisfied so long as you get the attractive design you wanted.

"Sure is a swell register! Good looks made the H & C No. 110 the most popular baseboard register in the world; and this is practically the same in appearance. The face is quickly detachable and has plenty of free area. And say, if you'd like to know how smooth is smooth, just try that valve-operating mechanism.

"Another thing I like about this register is that the valve can't hit the sides of the stackhead—ample clearance is provided."



Colonel: "Why bless my soul! Such unadulterated praise must be deserved! Let's toast the success of the job, Sir, in three fingers of good old juniper juice!"

Note: If you are one of the installers that prefer to make your baseboard installations with the stackhead overlapping the frame, by all means inspect the H & C No. 120 at once.

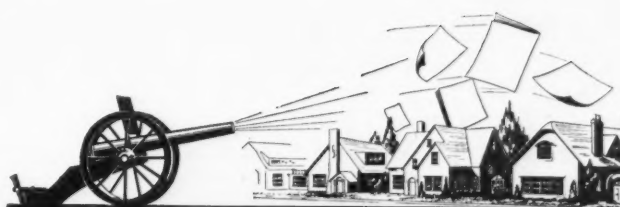
HART & COOLEY MFG. CO.

CAST AND
STEEL



WARM AIR
REGISTERS

GENERAL SALES OFFICE 61 W. KINZIE STREET, CHICAGO



SHOOTING your Message into every Home

To those who do not know you, you do not exist! Through your newspaper you can send little messages about yourself into practically every home in your community. Marshall Caloric Furnace dealers are furnished a complete series of newspaper advertisements. Our dealers receive a large sheet which illustrates all these various advertisements and they pick out one or more that they think best fits the condition in their territories. They then mail us the numbers printed on the sheet under the advertisements they want to run and we send them the mats free. Your newspaper reproduces the advertisements with your name and address appearing at the bottom of each advertisement.

This is just another way in which Marshall backs you up and helps you sell. The Marshall co-operative sales plan has worked wonders for others and it will work wonders for you.

Marshall Furnace Company Marshall, Michigan

Heating and Air Conditioning Equipment
54 Years Continuous Service

Marshall Furnace Company, Marshall, Michigan

Send me a copy of your proof-sheet showing advertising mats you furnish free to Marshall Caloric Dealers.

Name.....

Address.....

City.....State.....

AA-4

VERNALLOY

**PROCESSED IRON
FURNACES
CAN "TAKE IT" !**



It's been proven by tests that VERNALLOY PROCESSED IRON positively outlasts ordinary iron in furnace construction. It does not expand, crack or burn out when exposed to intense heat . . . like ordinary iron. Vernalloy can "Take It."

A VERNALLOY PROCESSED IRON furnace will stand up much longer than the best of ordinary furnaces . . . it is practically a life-time proposition.

Selling the VERNOIS VERNALLOY PROCESSED IRON FURNACE will place you far above your competition . . . assure your prospects and customers of their buying only the best . . . and create many additional sales which of course mean larger profits for you!



Write for convincing proof of Vernois superiority at once!

The Vernois Easy Payment Plan gives your customers up to 3 years to pay. Low Federal Housing Administration rates.

MT. VERNON FURNACE & MFG. CO.
Mt. Vernon Illinois

News Items . . .

Federal Housing Progress

The Federal Housing Administration completed one year of operation on June 27, 1935. During this year the administration was faced with the problem of creating an efficient organization; also, with the task of obtaining the co-operation of private financial institutions whose lending of money is the foundation of the entire program. Whereas at the beginning of the activity only 150 banks in the country were handling loans, today, practically every bank in the country is co-operating whole-heartedly.

During the year 8,000 different communities have conducted local housing campaigns with the co-operation of more than 250,000 citizens. Personal calls were made on 9,000,000 home owners and nearly 2,000,000 pledges for modernization jobs were obtained. At the end of one year loans have been secured for repair and modernization of buildings in the amount of \$90,000,000. It has been found that for every dollar of these modernization loans, from \$6.00 to \$8.00 worth of work, in addition, has been done and paid for in cash. This accounts for practically one-half billion dollars worth of modernization and repair work during the last year, either completed, under way or planned for the future. Losses on the \$90,000,000 worth of insured loans have been practically negligible and payments have been made promptly in practically every instance. At the end of one year, practically one million dollars worth of applications for insured mortgages have been going into effect. About one-third of these applications have been for new homes.

That FHA has definitely resulted in increased business for manufacturers and contractors in our industry is indicated by data showing that one large roofing contractor reports an increase in volume in 38 cities of approximately 23 per cent. One large furnace manufacturer reports increased sales 32 per cent ahead of the last quarter of 1933 and 28 per cent increase in the first quarter of 1935 over the first quarter in 1934. Another furnace manufacturer reports an increase in the value of paper handled of 63 per cent; a job increase of 50 per cent and a material supply increase of 46 per cent.

With the Manufacturers

Armco Extends Mill

Ground has been broken for the three and one-half million dollar extension to the East Works plant of The American Rolling Mill Company. George M. Verity, Chairman of the Board turned the first spade full of earth with the same silver spade that was used in breaking ground for the East Works plant in March, 1910. In breaking ground for the new extension, Chairman Verity said: "On March 10, 1910, I turned the first spade full of earth on the site of the East Side Works. East Works was originally planned to produce from 12,000 to 14,000 tons of ingot per month. I understand that the open hearths have recently produced as much as 58,000 tons of ingots in a month and we will have a potential capacity of from 60,000 to 65,000 tons in the near future."

"We are building a new unit requiring mammoth machinery and much of technical processing to enable us to take advantage of the latest and most approved methods of making high-grade sheets. This important action taken in these troublesome times proves our Company's faith in the future of the nation and of the steel industry."

A working force of approximately 150 men will be required to operate the new mill when it is completed, while 150 to 200 men will be employed on the construction work.

Pexto Appoints Interstate

The Interstate Machinery Co., Inc., 130 South Clinton Street, Chicago, has been given the exclusive distribution in Chicago territory on the complete Peck, Stow & Wilcox Company line. The Interstate Machinery Co., Inc., will now have available for shipment from their Chicago showrooms a partially complete range of lighter type power squaring shears, foot power shears, bar folders, rolls, hand machines, etc. Additional warehouse space has been taken to accommodate six carloads of machinery purchased recently.

THE BUYER KNOWS THE VALUE OF COPPER — A FINE EDUCATIONAL JOB HAS BEEN DONE FOR YOUR PROFIT

● H U S S E Y

Year after year, the story of copper has gone to your customers. They have been told why copper is better—why copper is cheaper in the long run.

Few, if any, of your customers have escaped the desire for copper that has been developed by this long-term educational campaign.

Why not cash in on it—you can. Simply figure the job in

copper too. Point out the advantages for the small difference in cost.

Many will say, "O.K.—do it with copper," because they know the extra value is there.

Your own reward is extra profit.

When you need copper, Hussey will supply it promptly. There is a Hussey mill or warehouse near you.

DISTRICT SALES OFFICES

BALTIMORE
BUFFALO
CHICAGO

CINCINNATI
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ST. LOUIS

NEW YORK
PHILADELPHIA
PITTSBURGH

WAREHOUSES

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CINCINNATI

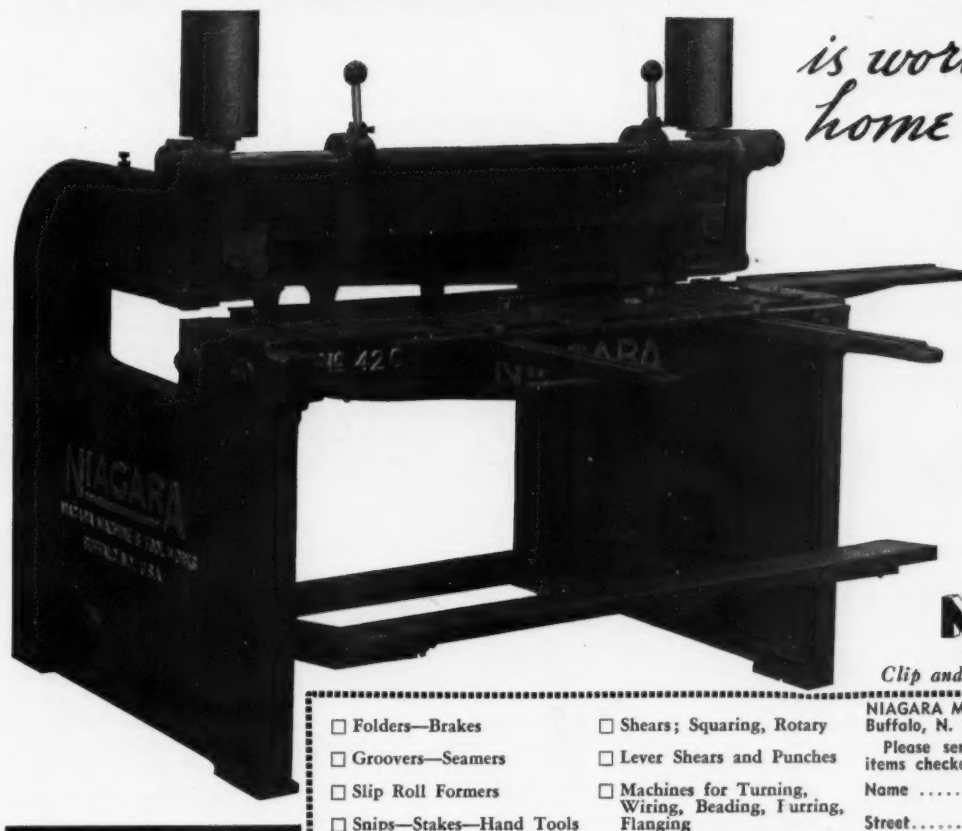
NEW YORK
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MILLS AND EXECUTIVE OFFICE
PITTSBURGH

C. G. HUSSEY & COMPANY
PITTSBURGH, PENNSYLVANIA

This new **NIAGARA** Foot Operated Shear.



*is worth writing
home about*

EASY TO
OPERATE
ACCURATE
CUTTING
16 GAGE
CAPACITY
18 INCH GAP
ACCESSIBLE
AT BACK
36" TO 72"
SIZES

NIAGARA

Clip and mail this coupon right now!

NIAGARA MACHINE & TOOL WORKS
Buffalo, N. Y.

Please send data on Foot Gap Shear and other items checked.

Name

Street..... City.....

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|--|---|
| <input type="checkbox"/> Folders—Brakes | <input type="checkbox"/> Shears; Squaring, Rotary |
| <input type="checkbox"/> Groovers—Seamers | <input type="checkbox"/> Lever Shears and Punches |
| <input type="checkbox"/> Slip Roll Formers | <input type="checkbox"/> Machines for Turning,
Wiring, Beading, Furring,
Flanging |
| <input type="checkbox"/> Snips—Stakes—Hand Tools | |



THE OWL WILL SPEAK

- In August
- This Space
- This Magazine

When a Wise Owl speaks, listen! He will have something to say worth listening to.

The wise, Wise Owl is going to speak in August in The American Artisan.

What he has to say is going to be of interest to every wide-awake furnace dealer in the country.

**This Wise Owl
Will Say It
Here Next Month**

WATCH FOR IT!

New Literature

For your convenience in obtaining copies of New Literature, use the coupon on page 70.

278—Motor Speed Transmitter

A variable speed transmitter, consisting of a constant speed electric motor built as an integral unit with a transmission whose output speed is adjustable over the entire speed range of the motor, is discussed in a leaflet prepared by the New Departure Manufacturing Company, Bristol, Connecticut. Full explanation of the design and operation of this new unit is presented by means of text and illustrated drawing.

279—Air Conditioning Stuffers

The Furblo Company, Hermansville, Michigan, announce a new series of mailing stuffers covering various aspects of air conditioning with furnace heating systems. These are colorful, small size leaflets replete with cross-section drawings and illustrations describing such aspects of air conditioning as air circulation, air cleaning, cooling by means of ventilation, remodeling of existing gravity to forced air heating systems, etc.

280—Water Cooling Coils

"Water coils for air conditioning", is the title of a new, comprehensive booklet announced by the Trane Company, La Crosse, Wisconsin.

This 30-page booklet shows all the various types of water cooling coils manufactured by the company. Many interesting charts and valuable information, relative to figuring cooling systems by means of cold water, are also presented. For example, the comparative operating cost of cooling with water and direct expansion refrigerants for 5, 10 and 20-degree temperature rise of the water is shown in chart form.

Each type of coil is accompanied by elevations and cross-section drawings with tables of dimensions, face areas and capacities. Tables show the heat transfer capacities of the various coils for different air and water velocities. Other tables show the air friction through the various types of coils. A number of tables covering total heat content of air at various wet bulb temperatures, mixtures of air and saturated water vapor, are present.

An interesting section of the new booklet covers step by step the necessary calculations to select a suitable coil for typical jobs of various types.

281—Hot Water Heater Leaflets

A four-page pamphlet, describing the round, rectangular boiler and the various types of coal burning, gas burning and oil burning water heaters manufactured by the Ideal Furnace Company, Detroit, Michigan, is announced by the manufacturer. The leaflet shows illustrations of the unit with necessary explanation of operation and all tabular matter for sizes, capacities and dimensions.

The company also has available a new booklet showing the improved lines of Ideal cast iron and pipeless furnaces.

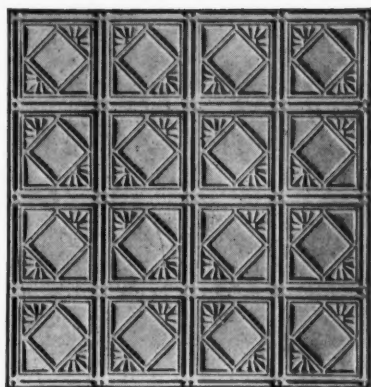
282—Spray Equipment Book

A new edition of Bulletin AD-114, 2 color, 32 page booklet issued by the Binks Manufacturing Company, 3114 Carroll Avenue, Chicago, gives prices and descriptions of new additions to the Binks line of Spray Equipment. New developments described include the Thor Model 5 touch-up gun with adjustable spray head and the Thor Model 6 touch-up and general utility gun. Also included is the No. 5 complete touch-up outfit with 6 extra cups, necessary hose and connections and handy metal tray.

283—Welding Electrode Booklet

Considerable technical data, including principles of design and operation, as well as physical properties and chemical analyses of deposited metals, are given in the new booklet devoted to Murex all-mineral coated welding electrodes issued by Metal & Thermit Corporation, 120 Broadway, New York City.

Features of these electrodes explained in the booklet include a patented spiral winding of asbestos yarn, which being non-combustible anchors the extruded coating to the core wire so that it does not crack when the electrode is bent. The Murex line comprises electrodes for practically all types of welding.



Write for
Canton Ceiling
Catalogue A

STRIKINGLY BEAUTIFUL NEW CEILING PATTERNS

Canton offers a complete line of distinctive new patterns in metal ceilings, and in time for you to cash in on the mounting volume of remodeling that is going on.

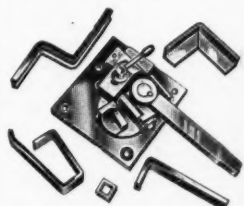
There are many definite advantages to steel ceilings. And they bring to sheet metal contractors a splendid profit that would otherwise go to other contractors working in other materials. Canton has made the selling of steel ceilings easy. It has modernized patterns and design. And the Canton Sales Helps should be in every contractor's hands. Write for them today.



Sold Through Leading Sheet Metal Jobbers

CANTON STEEL CEILING CO.
CANTON, OHIO

Warehouse Service: 497 West St., New York City
and Canton, Ohio



UNIVERSAL BENDER. Simple to operate. Nothing to get out of order.

Capacity, $\frac{1}{2}$ " x 2". Bends cold. Smallest square 3" x 3" cube.

RIVET SETS. Whitney rivet sets are drop-forged from the highest grade steel and designed to fill every requirement. Sold in 10 different sizes.



IMPERIAL ROLLER BEARING PUNCHES. Offered in 3 sizes. Will work inside 90 degrees. Quick changing for punches and dies. No cams to wear. Stripping positive.



RIVET PUNCHES & DIES. We can supply a complete assortment of rivet punches and dies from stock.

Good tools are essential to a profitable business. Make it a habit to use Whitney tools and to consult us on any tool problem.

WHITNEY METAL TOOL CO.
91 FORBES STREET
ROCKFORD, ILLINOIS

MEN WHO KNOW

are replacing their cleaning equipment
with the

GRAND RAPIDS FURNACE CLEANER



The unit has real capacity built into a one-man machine.

Powerful—beyond belief.

Sturdy—to stand hard knocks.

With a refined appearance and scientific construction.

All at our . . . NEW
. . . LOW . . . and
REASONABLE PRICE
. . . with "A Plan to
Increase Your Sales"
that works.

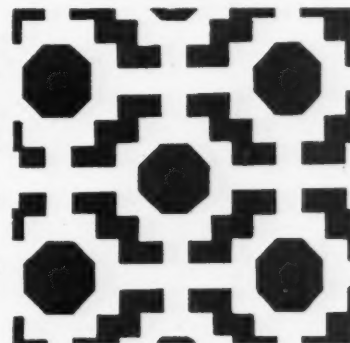
**Convenient
Terms**

Write for Details

**GRAND RAPIDS FURNACE
CLEANER CO.**
Grand Rapids, Mich.

LACECANE

more FREE
AIR SPACE
with Greater
Concealment



Lacecane is a development of an American Indian design. It is particularly suitable where the architectural motif is one of primitive simplicity. It harmonizes equally well with the essential characteristics of our so-called modern style. Made in Bronze, Brass, Aluminum as well as Cold Rolled Steel. Send for this folder. It shows LACECANE and many other new WISSCO designs.

WICKWIRE SPENCER STEEL CO.

41 EAST 42nd ST., NEW YORK CITY
WORCHESTER BUFFALO CHICAGO SAN FRANCISCO

WICKWIRE SPENCER
perforated metals

*Cash in on the
BIG DEMAND
for relief from
summer heat*

Here's How!

Modern living standards in work, recreation, and rest demand increased comfort inside buildings during hot weather.

The Swartwout-Dexter Heat Valve is the logical choice because it is positive in results, and **DOES NOT COST ONE CENT TO OPERATE** all summer long.

Made in sizes applicable to every type of building—industrial, commercial, or residential.

Make profits while the sun is hot:—write for full information today.

The SWARTWOUT COMPANY
18615 Euclid Avenue Cleveland, Ohio



THE NEW PEERLESS 1935 FURNACE-REPAIR CATALOGUE

Now in the hands of
the printer . . . will
be ready very shortly.

SEND FOR YOUR COPY NOW!

Firm Name.....

Address

City..... State.....

Requested by.....

PEERLESS FOUNDRY CO., Indianapolis, Ind.

New Literature

For your convenience in obtaining copies of New Literature, use the coupon on page 70.

284—1935 Discount Book

Rock Island Register Company, 2435 Fifth Avenue, Rock Island, Illinois, announce a new price book and discount sheet effective June 1, 1935. The booklet contains a full listing of prices and discounts for the many lines of items handled and manufactured by the company. A new departure in this price sheet is the incorporation of the Standard Code for gravity furnace installation, also the Mechanical Code for design of forced air heating systems.

285—Fan Leaflet

A series of three leaflets, showing various types of Emerson fans and methods of application and use, has been published by Emerson Electric Manufacturing Company, St. Louis, Missouri.

The first leaflet describes and illustrates methods of application for an exhaust fan of the propeller type, suitable for installation in homes, attics or commercial establishments.

The second leaflet describes the new kitchen exhaust ventilator of the propeller type. The unit may be permanently installed in an outside wall and is completely housed with outside louvres and an interior door. Other applications are above and below windows with suitable sheet metal housings for such applications.

The third leaflet deals with the larger size of exhaust fan suitable for use in offices, commercial or industrial establishments for removal of heat and odors. These fans are of the propeller type, in sizes from 12 to 30 inches. Numerous typical applications are shown by means of photographs with additional helpful installation data, performance tables, etc. Such accessories as switches, louvres and controls are described in detail. Tables showing full dimensions, capacities, ratings and prices are presented in the booklets.

286—Direct Mail Literature

A set of direct mail literature, which the company recommends for use by salesmen; also as first and second mailing pieces and follow-up mailings to salesmen's personal calls, is announced by Delco Appliance Corporation, Rochester, New York. Large size illustrations of the Delco-Heat oil burner, with emphasis given to features of construction and operation, are shown in all the leaflets. An unusual feature of the general make-up is the employment of two figures who indulge in conversation regarding the oil burners. These figures discuss between themselves the many features of the oil burner and its component parts. A considerable amount of information on service, methods of buying oil burners under FHA, guarantee of the local dealer, plus some quotations from letters of recommendation, are included in both leaflets. The leaflets are large in size and use color and display space elaborately.

FOR YOUR CONVENIENCE

American Artisan, 6 N. Michigan Ave.,
Chicago, Ill.

Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature." (Check numbers in which you are interested):

159	160	161	162	163	164	165
166	167	168	169	170	171	172
173	174					
278	279	280	281	282	283	284
285	286					

Name..... Title.....

Company

Address



AN OUNCE OF PREVENTION

Now that forced and conditioned air units are imposing a new responsibility on asbestos furnace cements, you'll avoid complaints and insure permanent satisfaction by depending upon the extra strength of Laclede's better product.

Manufactured by
LACLEDE-CHRISTY
Established 1844

411 N. Seventh St.

ST. LOUIS, MO.



Only by using a
VIKING
can you get true Viking Performance

Viking shears are real performers in the shop. They have the ruggedness and power that sends them through a heavy sheet as though it were paper. They are made for service and they can take punishment.

Yet always there is that ease of handling and balance that makes them seem as handy as a pocketknife. Why not use Vikings—they pay for themselves over and over again.

Send today
for complete
information.

VIKING SHEARS
VIKING SHEAR CO., ERIE, PA.



Boomer Boiler Plate Furnaces

Also made with duplex grates and upright shaker.

Have been successfully made for 22 years. Where introduced have given satisfactory service. The fire pot liners are the best we can buy and we know of several Boomers that still have the original liners in, which are 22 years old. We have been making cast iron Boomers for 50 years.

If you are interested in selling a strictly high grade furnace, ask for prices and agency.

Nothing but the best of material enters into the making of Boomers.

When repairs are needed, avoid risk of dissatisfaction by ordering direct from the original patterns. Prices are low.

We sell to legitimate dealers only.

THE HESS-SNYDER CO., MFRS.
Massillon, Ohio

WHITNEY No. 2 PUNCH



Illustrated is our No. 2 Punch. Capacity $\frac{7}{8}$ -in. hole through $\frac{1}{4}$ -in. iron. Length 23-in. Weight 13 lb. Depth of throat $1\frac{1}{8}$ -in. Stock sizes $\frac{3}{8}$ -in. to $\frac{1}{2}$ -in. by $\frac{3}{4}$ -in. Complete tool includes one punch and one die of specified size and die adjusting key.

THE WHITNEY LINE

In the W. A. Whitney line of Hand Lever Punches you will find a portable hand lever tool suitable for every requirement. They are made in ten sizes and types, ranging in size from the Tinner's No. 4 Punch, which punches $\frac{1}{4}$ -in. hole through 16 gauge iron to the No. 92 Punch, capable of punching a 2-inch hole through $\frac{1}{8}$ -in. stock. Each tool has its special field of work as recorded in our latest catalog.

WRITE FOR CATALOG G



WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL.

St. James Cathedral

(Continued from page 25)

top moulding of the spire would facilitate operations. The scaffolds were accordingly erected upon wood beams projected out through dormer windows or bolted to the spire frame.

Copper used throughout was 16 oz. cold rolled sheet. As the old iron was removed, sound sections in good condition were used to make patterns for the new copper work. The removed iron from the hips, pan sheets, mouldings, crockets, plinths was thus used for patterns. From these old sections the new work was executed in the contractor's shop and delivered on the job in sections suitable for erecting.

The self-capping pan sheets were cut mitered as required for the angle of the hips and was attached to the heavy framed pine sheathing timbers by means of $\frac{7}{8}$ -inch copper clips attached to the sheets at 12-inch centers. All work was carried on progressively from the bottom up. The pan sheets are turned up to take a separate cap which is rolled at the top. Wood

battens are used for the hips. The hips were slotted for the crockettes which were seamed to the hips.

The moldings were fabricated as complete lengths from hip to hip. The plinth was made up in four complete sections ready for erection.

Hoisting of material up the steeple had to be done very carefully to avoid disfiguring any of the stonework of the church through chipping. Special care had to be taken in windy weather, both from the standpoint of raising materials and also to protect the men working on the suspended scaffolding. At the top of the steeple a very noticeable swaying was experienced when the wind was strong.

The weathervane, over 300 feet from the street level, is made of iron and measures eight feet by four feet six inches. This is mounted on a $2\frac{1}{4}$ -inch stem. At the base of the weathervane stem is a round copper ball. This was fashioned in two sections in the

More than 10,000 pounds of copper were required for the project. workshop of the contractors.

Store Heating

(Continued from page 26)

fabricated in short sections, with long sweep elbows and drive cleat seams. The furnace is a 34-inch firepot, steel, housed in a round casing.

While there is no provision for cooling such as refrigeration and coils, ice or cold well water, the owner does plan to get whatever cooling may be secured by mixing basement and store air together. A slide door has been placed in the blower housing and cut off dampers have been placed in the return air trunks. The plan is to shut off recirculation by closing these return line dampers and open the blower housing. The air from the basement will then be blown into the store, setting up a slight pressure which will help keep out some of the hot street air and reduce the store temperature somewhat. Provision has also been made for speeding up the blower so that six air changes per hour can be introduced during hot days.

"BB"

The mark of quality
on sheet metal and
roofers' supplies

BERGER BROTHERS CO.
229-237 ARCH STREET, PHILADELPHIA, PA.

EAVES TROUGH
GUTTER HANGERS
CONDUCTOR PIPE
CONDUCTOR FASTENERS
MITRES
END PIECES AND CAPS
CONDUCTOR HEADS
ORNAMENTAL STRAPS
VENTILATORS, ETC.

BRILLION

WARM AIR FURNACES



No. 100 Series

The 100 Series is a pipe furnace of two-piece radiator construction of the horseshoe type or two way travel. Radiator is convertible so that smoke pipe can be taken out at any convenient point. Casings can be furnished lined or unlined as an extra. Write for complete construction details.

Brillion offers the dealer a line of furnaces which makes for customer satisfaction and dealer profits. Guaranteed . . . embodies all modern improvements . . . efficient in operation . . . economical in fuel consumption . . . durable . . . long service. Go after business with Brillion quality and performance to back you up. Get our dealer proposition.

Write Now For Catalog

BRILLION FURNACE COMPANY
BRILLION, WISCONSIN

WARM AIR FURNACES
FURNACE FITTINGS
FURNACE PIPE
REGISTERS

FILTERS

FANS

BLOWERS

CONTROLS

A DEPENDABLE SOURCE OF SUPPLY

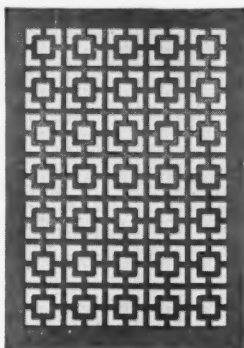
THE J. M. & L. A.
OSBORNE Co.
Manufacturers—Distributors
DETROIT-CLEVELAND-BUFFALO

PERFORATED METALS

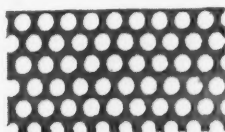
Many designs of Perforated Metal for Architectural Grilles, Radiator Enclosures, Air Conditioners, Cabinets, Safety Guards, and for all screening and sizing operations.

Steel, Stainless Steel, Brass, Bronze, Copper, Monel, Aluminum, Zinc and other metals or materials perforated to your order.

Round holes from .020" to 7".
Slot holes from .008" to 3" wide.
Square holes of standard sizes.
Complete line of brass and tin in small sizes. Prompt Service—Pleasing Prices.



Send us
your next
specifica-
tions.



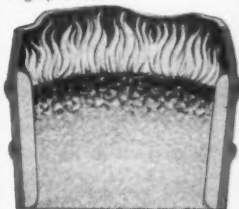
(Note: Equally spaced holes make for uniform strength, improved appearance and durability.)

The
Harrington & King
PERFORATING CO.

3649 Fillmore St., Chicago, Ill. New York Office, 114 Liberty St.



Repairs Burned-out Pots
FIRELINE is a new type plastic refractory material that conforms to any shape and fuses into a tough non-cracking mold. It permanently repairs cracked or broken firebowls at low cost and high profits.



Increases Heat Capacity and Combustion Efficiency

FIRELINE greatly increases the efficiency of a furnace by raising combustion temperature—burning all burnable fuel and minimizing smoke, soot, gas and ashes. It makes a tremendous difference in plant performance and cuts fuel requirements from 10 to 20%.

FIRELINE
every new firebowl
FIRELINE
every old one

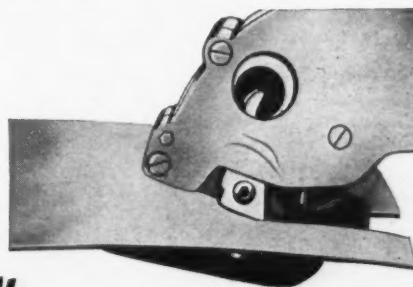
\$10 PER HOUR for LABOR with EVERY building a prospect! Lower fuel costs, the end of smoke and soot, no more furnace gas, more heat from the same fuel and plant—it's the sales story they all WANT to hear.

Smart heating men are cashing in on this remarkable new material, are making this summer the big season, are greatly increasing their list of customers, are putting out solicitors and putting men to work . . . and everybody is profiting. Investigate FIRELINE. Get all the facts.

Write for FREE SAMPLE for test, and bulletin giving data and describing sales helps.

Fireline Stove & Furnace Lining Co.
1166-AG Clay Street CHICAGO, U. S. A.
(Copr. 1935, Fireline Stove and Furnace Lining Co.)

FIRELINE



What AN APPETITE!

You can feed sheet metal or any other sheet material all day long, and day after day, to a Stanley "Mighty Midget" Unishear with the same results—smooth, clean accurate cuts.

With a speed up to 15 feet per minute this Unishear will cut curves, angles or straight lines with hairline accuracy. Pivoted Duplex Handle permits the tool to be used in any position.

Capacity: 18 U. S. Gauge (.050") hot rolled steel, other materials in proportion. Weight: only 7 pounds.

• Stanley Unishears are available in several portable and stationary models with capacities up to 1/4 inch boiler plate.

Descriptive circular upon request.

STANLEY ELECTRIC TOOL DIVISION
THE STANLEY WORKS
131 ELM STREET, NEW BRITAIN, CONN.



STANLEY UNISHEAR

Let Mechanics Sell

(Continued from page 24)

are just as great. They are skilled craftsmen and know exactly why the sheet metal work they do is superior to that done by their competitors. In fact, this intimate knowledge gives them a distinct advantage over the average salesman. People overlook many minor defects of a man's sales presentation if they realize he knows what he is talking about.

Often employees don't live in the same neighborhood as the boss and this increases their value as salesmen. They know different people and they see and hear of sheet metal work that would never come to his attention. This information alone may lead to enough jobs to justify the effort required to make employees sales-minded.

Workmen have certain qualities which enable them to sell, but it requires some imagination to show them how they can get started.

Probably the first thing you'll have to do is explain the importance of sales to them from the standpoint of employment, as well as profit to you. In other words, make them realize that without orders there can be no work.

Next you will have to convince them that they can sell. Tell them nobody, no class, no one group has any monopoly on selling. Education isn't necessary to close orders. The main thing is an earnest desire on the part of the workman to get business and a willingness to try to convince the prospect. You can repeat the story of the weather-strip salesman and the one about the coal company, too, if you like. Explain that you will be ready to work with them at all times on jobs which they cannot close themselves.

Help Your Men

Above all else be sincere in your efforts to make salesmen out of your workmen, and don't joke or make fun of their mistakes, no

matter how humorous they seem to be.

Now comes the question of time—when are my men to do this selling? "Every spare moment," is the answer!

Those days or half-days when things are slack around the shop could be spent following up leads obtained after working hours or on Saturday or Sunday. When it is necessary to rotate the force, giving each man two or three days work a week, tell them that whoever brings in a job during that time will be allowed to do the work. With this opportunity for steady work depending partly on themselves, they may surprise you by getting orders that will keep them busy all the time.

Besides increasing present sales, a campaign like this will create a feeling of security and importance among your employees that will help to insure the success of your company.

FURNACE REPAIR PARTS . .

Parts to fit every make—specially designed "to fit the job" as is.

National is one source for all your needs. Catalog No. 23, listing names, numbers and prices, is ready. It is yours for the asking—send for it now.

NATIONAL FOUNDRY & FURNACE CO.
STATION "B" DAYTON, OHIO



XXTH CENTURY FURNACES

KEEP OLD MAN WINTER ON THE RUN

XXTH CENTURY HEATING & VENTILATING CO.
AKRON, OHIO

PROVE IT TO YOURSELF

*Liquid, Paste
& Core Solder*



Rubyfluid, the perfect soldering flux, will solve your soldering problems by assuring you uniform, neat work at a substantial savings in time, labor and materials. A trial will prove its merit.

Free Sample on Request

Specify liquid, paste, acid or rosin core.

RUBY CHEMICAL CO.
74 McDowell St. Columbus, Ohio

Rubyfluid

BETTER RESULTS

**WITH
WALSH ASBESTOS
FURNACE CEMENT**

Use Walsh Asbestos Furnace Cement for certain and satisfactory results on all installation and repair work.

WALSH REFRACTORIES CORP.
Producers of High Grade Refractories
for 50 years

4430 North First Street, St. Louis, Mo.



Walsh Asbestos Furnace Cement is furnished in 1, 2, 3, 5, 8 and 10 lb. cans; 25, 50, 100, 250, 500 lb. steel drums. We also manufacture Furnace Tile and Fire Brick.



**"OAKLAND"
and
"Z-RO-KING"
FURNACES**

**OAKLAND
FOUNDRY CO.**
Belleville, Ill.

LOWER PRODUCTION COSTS



are made possible by the use of Gardiner Flux-Filled Solder. Its uniform high quality and perfect flux save time and material. Both expert mechanics and inexperienced help can do faster and better work.

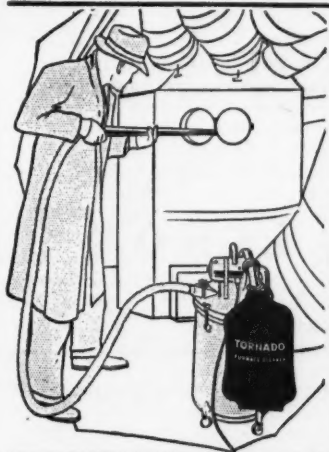
Due to modern production methods Gardiner Solder sells for less than ordinary solders.

**Gardiner
METAL CO.**

4831 So. Campbell Ave., Chicago, Ill.

Put up in 1, 5 and 20 lb. spools.

We also make high quality bar, solid wire solders and babbitts.



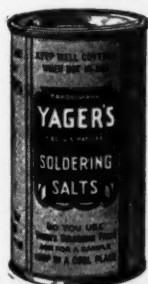
**"I'd Rather Give Up My
Whole Shop Than Give Up
My Tornado Furnace
Cleaner.
Nothing Pays So Well!"**

An energetic furnace dealer in South Dakota believes furnace cleaning service is the greatest aid to the sheet metal worker. He says, "Furnace cleaning gets you into homes that could never be approached by any other method." What an ideal plan for obtaining business under the FHA plan and securing profitable repair and replacement business.

Keep step with the times and modernize your sales and service with the Tornado Furnace Cleaner—complete tools (chimney cleaner if desired), great power, more Tornado cleaners in use than any other type. Write for Free Trial offer.

Breuer Electric Mfg. Co.
865 Blackhawk Street, Chicago, Ill.

**YAEGER'S SOLDERING SALTS NOW
BETTER THAN EVER BEFORE**



The result of an improvement in formula coupled with installation of new machinery for grinding and blending, enable us to produce a flux of absolute uniformity in mix and more quickly soluble in water. Packed in: 1/2 lb., 1 lb., 5 lb. tins and in 25 lb. and 50 lb. drums.

Write Dept. "S"

ALEX. R. BENSON CO., Inc.
HUDSON NEW YORK

RYERSON

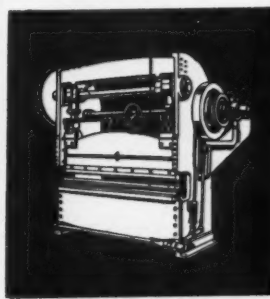
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More than twenty kinds of prime quality sheets are carried in stock. There is a special sheet for every purpose. Also Bars, Angles, Rivets, Bolts, Tools and Metal-Working Machinery.

Write for Journal and Stock List

JOSEPH T. RYERSON & SON Inc.
CHICAGO MILWAUKEE JERSEY CITY BUFFALO PHILADELPHIA
DETROIT ST. LOUIS CINCINNATI CLEVELAND BOSTON

SHEETS



PRESS BRAKE



CHICAGO

HAND BENDING BRAKE

Steel Brakes—Presses—Shears

DREIS & KRUMP MFG. CO.
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ÆOLUS
Improved
VENTILATORS



**FOR industrial buildings,
schools, homes, theaters, etc.
Made in 14 different metals.
Constant ventilation—no noise
—no upkeep.**

ÆOLUS DICKINSON
Industrial Division of Paul Dickinson,
Inc.
3332-52 South Artesian Avenue
Chicago, Ill.

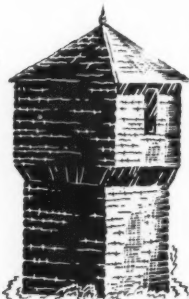
**ALL REPAIR PARTS for FURNACES
BOILERS
STOVES
RANGES**

**A.G. BRAUER
SUPPLY COMPANY**

316 NO. THIRD ST. + SAINT LOUIS
IN STOCK • READY FOR IMMEDIATE SHIPMENT

Portals of HOSPITALITY

FORT DUQUESNE
Built 1754



Pittsburgh has played an important part in the settlement and growth of these United States. Here was the far frontier of the original thirteen colonies. Today this great hotel, symbol of modern hospitality, towers high above tiny Fort Duquesne, which for one hundred and eighty years has stood "at the forks of the Ohio," the last portal of hospitality for those headed downstream to "Ole Kaintuck." ■ Experienced

travelers recognize this fine hotel as the best address and the largest hotel in Pennsylvania. Four restaurants, the famous Urban Roof Garden and the air-cooled Continental Bar.

Rates from \$3.50 Single, \$5.00 Double

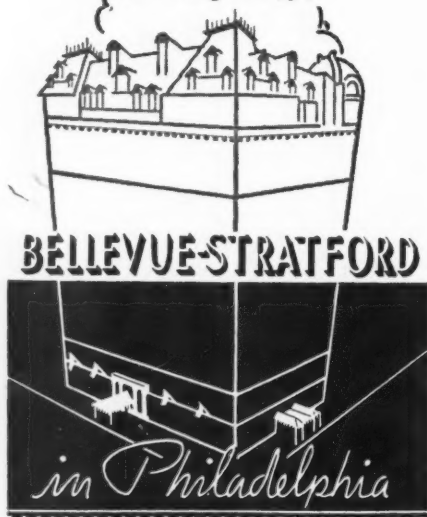


**HOTEL
WILLIAM PENN**
PITTSBURGH



Making
hospitality a very personal consideration has made the Bellevue, your home in Philadelphia, one of the World's best known hotels.

(Rates Begin at \$3.50



CLAUDE H. BENNETT, General Manager



MAKE MICHIGAN AVENUE Your Home When You Visit CHICAGO

Every comfort, every fine hotel luxury awaits you at the newly modernized Auditorium Hotel. Unusually good food at modest prices.

ROOMS WITHOUT
PRIVATE BATH
from **\$1.50**



ROOMS WITH
PRIVATE BATH
from **\$2.50**

Geo. H. Mink, Mgr.

Hotel **AUDITORIUM**
MICHIGAN or CONGRESS **CHICAGO**

When in Buffalo

Enjoy the quiet of a fine hotel centrally located to the business district yet away from downtown din. Meals that long remain a pleasant memory. Rooms that encourage rest. Single—\$1.50 to \$3.00. Double—\$2.50 to \$5.00. Suites—\$5.00 and up. Write for descriptive booklet and map of Buffalo.

HOTEL LENOX

140 North St.

Clarence A. Miner
President

Near Delaware

Now Ready!

LEWIS' NEW
AIR CONDITIONING FOR COMFORT
280 pages—5½" x 8½"—\$2.50

Everyone interested in air conditioning should own a copy of this practical, understandable book. Written by Samuel R. Lewis, one of the world's foremost air conditioning engineers, it tells you what air conditioning is, how it works, what it costs, and how to proceed in the designing of satisfactory systems. Published July 15th, it is the most up-to-date, accurate, and informative book to be had on the science of conditioning air.

Send \$2.50 for a copy to the address below. You may order with the privilege of returning the book within 10 days for a refund if for any reason you do not care to keep it.

KEENEY PUBLISHING CO.

6 No. Michigan Ave.

Chicago, Ill.

CLASSIFIED ADVERTISING

4 cents for each word including heading and address. Count seven words for keyed address. Minimum \$1.00 for each insertion. One inch \$3.00. Cash must accompany order. Copy should reach us eight days in advance of publication date. Display rates for this page will be furnished on request.

SITUATIONS WANTED

POSITION WANTED by tinner, plumber and furnace man. Have Master Plumber license. Address Wm. Meyer, 264 Washington Avenue, Hartford, Wisconsin.

SHEET METAL WORKER. 27 YEARS heating, ventilating, blow-pipe and supervising experience. Best references. Will go anywhere. Address Key 324, "American Artisan," 6 North Michigan Avenue, Chicago, Illinois.

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GO IN BUSINESS FOR YOURSELF selling and installing furnaces and air conditioners. We furnish all material. You get all your money when the job is completed. Address Key 322, "American Artisan," 6 North Michigan Avenue, Chicago, Illinois.

WANTED BY LARGE SHEET METAL and Heating Contractors in the East, capable man to take complete charge of the Warm Air Heating Department. Must be able to lay out and supervise own work. Wonderful opportunity for one who can qualify. Address Key 327, "American Artisan," 6 North Michigan Avenue, Chicago, Illinois.

WANTED: FIRST CLASS TINNER FOR working foreman. Address Key 325, "American Artisan," 6 North Michigan Avenue, Chicago, Illinois.

PARTNER WANTED: Salesman to become interested in small manufacturing plant making fruit display stands, adjustable elbows, and other special metal products. Address Key 326, "American Artisan," 6 North Michigan Avenue, Chicago, Illinois.

EXPERIENCED FURNACE JOBBER Salesman who can also qualify in sales on other lines and be capable of directing sales in general. Address Key 323, "American Artisan," 6 North Michigan Avenue, Chicago, Illinois.

SALESMAN WANTED: Salesmen to sell to trade. Complete line of furnace accessories for Wisconsin and adjoining states. References required. Address Key 328, "American Artisan," 6 North Michigan Avenue, Chicago, Illinois.

SALESMAN WANTED: Experienced Furnace and Air Conditioning salesman. Must be able to lay out and estimate work and get the orders. Complete line of coal and gas furnaces and gas conversion burners. Sioux City, Iowa, territory. A good opportunity for a young man willing to work. Permanent position to one making good. Address Sioux City Foundry & Boiler Co., Sioux City, Iowa.

FOR SALE

Sheet Metal Machines New and Really Rebuilt

A machine for every use and every machine is ready for use. The largest stock in Chicago. Ask for list.

Complete supplies and tools.

**MAPLEWOOD
MACHINERY CO., Inc.**

Chicago

2634 W. Fullerton Ave. Brunswick 9200
561 W. Washington Blvd. State 1405

FOR LEASE OR SALE TO CLOSE ES-
state: A complete set of roofing and sheet metal equipment and building, ready to operate. Located at Hastings, Nebraska, within 25 miles of flood area. A wonderful opportunity for the right party. Write the First Trust Company, Lincoln, Nebraska.

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**HAVE YOU A SHEET METAL
PROBLEM: FORMING—BENDING—
PUNCHING—SHEARING**
**WE HAVE A MACHINE FOR
EACH OPERATION ON
SHEET METAL**
Your Inquiries Earnestly Solicited
WARD MACHINERY CO.
SPECIALISTS
**MACHINES—TOOLS—SUPPLIES
FOR SHEET METALS**
562 W. Washington Boulevard
CHICAGO, ILLINOIS

Patents and Trade Marks

Philip V. W. Peck
Barrister Bldg., Washington, D. C.

FOR SALE

FOR SALE: SHEET METAL AND
Plumbing Shop. Location, Alabama. Mills have run all through depression. Other interests is reason for selling. Address Key 345, "American Artisan," 6 North Michigan Avenue, Chicago, Illinois.

FOR SALE: PLUMBING, HEATING AND
Sheet Metal Shop. Also all kinds of Roofing, House Paint Consignment, Stock and Tools, Work Benches. Inventory \$650.00. \$300.00 will handle. Only plumbing shop in town of 2,200. Low Rent. Near Detroit. A. C. Buzzard, Buzzard Building, Holly, Michigan.

SPRAY NOZZLES: RAINBOW MIST
Spray Nozzles for washed air units, fool-proof, no dirt clogging, breaks water to the finest misty spray possible—61 cents each. Lots 100 or more, 54 cents each. Dealers wanted. We manufacture washers and blowers. Two used blowers on hand now. Peterson Freezem Sales Company, 2620 Charlotte, Kansas City, Mo.

WANTED: DISTRIBUTORS

for Hay Fever Filter Ventilator. Big sales easy during July, August, September. Lowest prices. Liberal discounts. Free Advertising and Sales helps. Don't delay—write today.

KAISERAIRE PRODUCTS SALES CO.
936 West Chicago Ave., Chicago, Ill.

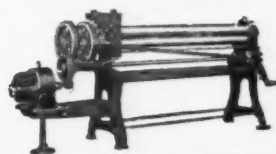
YOU CAN BENEFIT BY BUYING EFFICIENT Sheet Metal Machinery at INTERSTATE



EXCLUSIVE AGENTS
Chicago Territory
Write for
**INTERSTATE-PEXTO
CATALOG**

Also agents for Dreis & Krump—
Whitney—Beloit—Marshalltown—
Dyer.

"Draw On the
**MOST COMPLETE STOCK
IN AMERICA**"



Don't let your Surplus Machinery stand idle. **TRADE IT IN** on Interstate Guaranteed Reconditioned Equipment. We carry America's largest stock Modern Machinery at prices that will suit your bank book. Let us quote.

Send for Bulletin No. 835 listing modern requirements. **HAND
NEW ROLLS—SHEARS—BRAKES—PUNCH PRESSES
& BUTT. ARC & SPOT WELDERS—FOLDERS
USED PRESS BRAKES—HAND MACHINES—STAKES POWER**

INTERSTATE MACHINERY COMPANY
130 S. Clinton St. Chicago
(FREE PARKING)

RECENT REBUILT TRADE-INS
36" x 3" Pexto B. G. Slip
Roll.....\$75.00
24" Throat Hand Sign Punch.....\$45.00
30" Pexto Bar Folder.....\$35.00
32" Pexto Foot Shear, all ga.....\$55.00
No. 2 Whitney Hand Punch.....\$8.50
42" x 4" Slip Roll, 11 ga.....\$150.00
300 Amp. Lincoln Port. Arc Welder.

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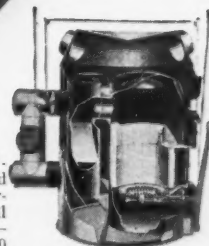


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